Packet Reference Manual

Monarch® Printers

9825®
9855®
9860



AVERY DENNISON

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GETTING STARTED

1

Before you read this manual, review the printer information in the *Operator's Handbook*. This manual provides the necessary information to design, write and print a Monarch® Printer Control Language II (MPCLII) format. The following printers support this type of format:

9825® (V. 1.0 or greater)

9855® (V. 1.0 or greater)

9860™ (V. 1.0 or greater)

See Appendix E, "Printer Differences" for a description of each printer's features.

About This Manual

You do not need to be a programmer to use this manual, but you must be familiar with creating text files and using basic MS-DOS® commands. This chapter describes how to

create and download a sample MPCLII packet.

use the Supply Layout Grid and Format Worksheet.

categorize data into field types and select fonts to use in your format.

See "Defining Text Fields" in Chapter 3 for a list of available fonts for your printer. See Chapter 4, "Defining Field Options," for a list of available options for your printer.

Before You Begin

1. Connect the printer to the host. Refer to the *Quick Reference* for more information.
2. Load supplies in the printer. Refer to the *Quick Reference* for more information.
3. Turn on the printer.
4. Set the communication parameters and configure the printer. The communication parameters at the printer must match those at the host. See Chapter 2, “Configuring the Printer,” for more information.
5. Design your format. See “Starting with a Design” for more information.
6. Download your format to the printer. See Chapter 6, “Printing,” for more information.

Creating an MPCLII Format Packet

A *format* defines which fields appear and where the fields are printed on the label. The printer requires this information in a special form, using Monarch® Printer Control Language II (MPCL). This section describes how to create a sample MPCLII format packet.

Make sure supplies are loaded, the printer is connected to the host and is ready to receive data. Refer to the *Quick Reference* for more information.

For detailed information about the format header, text, constant text, and bar code fields, see Chapter 3, "Defining Fields." For information about batch packets, see Chapter 6, “Printing.”

1. Type the following format header in any text editor:

   ```
   {F,25,A,R,E,200,200,"FMT-25" ¦
   ```

2. Type the following constant text field:

   ```
   C,140,40,0,1,2,1,W,C,0,0,"SAMPLE FORMAT",0 ¦
   ```

3. Type the following bar code field:

   ```
   B,1,12,F,85,40,1,2,40,5,L,0 ¦
   ```

4. Type the following text field:

```
T,2,18,V,50,50,1,1,1,1,B,L,0,0,1  ¦}
```

You have created a format packet for your MPCLII printer. Now, a batch packet must be created before you can print the format.

5. Type the following batch header, after the text field line:

```
{B,25,N,1 ¦
```

6. Type the following bar code data:

```
1,"02802811111" ¦
```

7. Type the following text field data:

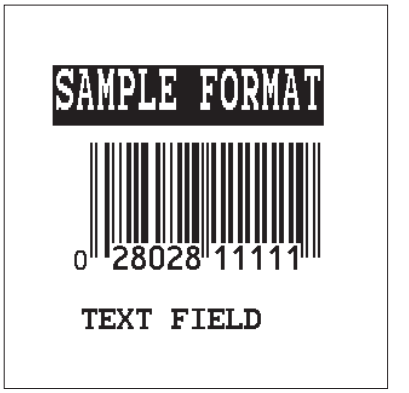
```
2,"TEXT FIELD" ¦}
```

8. Save your file as SAMPLE.FMT.

9. Type MODE COM1:9600,N,8,1 at the DOS prompt if you are using serial communications. This sets the communication parameters at your host. These communication parameters must match those at your printer. See “Setting Communication Parameters,” in Chapter 2, or your host’s documentation for more information.

10. Type COPY SAMPLE.FMT COM1. The following 2 inch by 2 inch label prints:

```
{F,25,A,R,E,200,200,"Fmt 25" ¦
C,140,40,0,1,2,1,W,C,0,0,"SAMPLE FORMAT",0 ¦
B,1,12,F,85,40,1,2,40,5,L,0 ¦
T,2,18,V,50,50,1,3,1,1,B,L,0,0,0 ¦ }
```



Sample Batch Packet

```
{B,25,N,1 ¦
1,"02802811111" ¦
2,"TEXT FIELD" ¦ }
```

See “Starting with a Design” to design your format and Chapter 3, "Defining Fields" to create text, bar code, and line fields.

Daily Startup Procedures

You may want to design a checklist for operators to follow each day. Here are a few suggested items: Turn on the printer and host, make sure ribbon and supplies are loaded, make sure communication parameters are set, and download packets from the host to the printer.

You may want to keep records of supplies that have been printed. A good way to do this is to design a print log for operators to complete at the end of the day. Here are some suggestions for types of information to include in a print log: date, operator’s name, format name, supply size, quantity printed, evaluation of print quality, and problems/comments.

Keep backup copies of your format, batch data, check digit, and graphic packets.

Starting with a Design

Before you create a format packet, you must design your label. There are several steps to designing a custom label:

1. Decide which fields should appear on your label. See “Determining Format Contents” for more information.
2. Determine your label size. Labels are available from us in a wide variety of sizes. Your application and the amount of data you need to print determines the supply size. Contact your Account Manager or Technical Support for more information.
3. Draw a rough sketch of your label. You may want to draw several variations to see what works best. See “Drawing Rough Sketches” for more information.
4. Identify the field types that appear on your label. See “Considering Field Types” for more information.
5. Decide which fonts you want to use. See “Considering Fonts” for more information.
6. Fill out your Format Worksheet. See “Using the Format Worksheet” for more information.

At this point, you are ready to send your design to the printer. To do this:

7. Create a format packet, based on how you filled out your worksheet. See Chapter 3, “Defining Fields,” for more information.
8. Download your format packet to the printer. See Chapter 6, “Printing,” for more information.

Determining Format Contents

Before you lay out your format, answer these questions. How large is your supply, which fonts do you want to use, do you want to include a bar code, and do you want to include graphics?

Determining the Print Area

The “bottom” (or leading edge) is the edge that exits the printer first. The 0,0 point is at the bottom left corner of the label. The print area is in the center of the label.

Printer	Unit of Measure	Max. Supply (Wid x Len)	Max. Print Area (WidxLen)	Min. Supply (Wid x Len)	Min. Print Area (Wid x Len)
9825	English Metric Dots	425 x 1750 1080 x 4445 863 x 3553	400 x 1600 1016 x 4064 812 x 3248	75 x 50 191 x 127 152 x 102	75 x 50 191 x 127 152 x 102
9855/ 9860	English Metric Dots (203) Dots (300)	425 x 1750 1080 x 4445 863 x 3553 1275 x 5250	400 x 1600 1016 x 4064 812 x 3248 1200 x 3900	75 x 32 191 x 81 152 x 65 225 x 96	75 x 32 191 x 81 152 x 65 225 x 96
9855RFMP 9855HF	English Metric Dots (203) Dots (300)	400 x 1300 1016 x 3300 812 x 2639 1200 x 3900	400 x 1600 1016 x 4064 812 x 3248 1200 x 3900	400 x 100 1016 x 254 812 x 203 1200 x 300	400 x 100 1016 x 254 812 x 203 1200 x 300

Note: You can create longer images if you reallocate memory to increase your image buffer. See "Defining the Memory Packet" in Chapter 2 for more information.

The following non-print zones are *recommended* for the printers:

All Supplies	.050 inches on either edge of the label.
All Supplies	.020 inches at the end of the label.

If using the optional verifier, allow a minimum no-scan zone on the trailing edge of the label of 0.5 inch (13 mm). The trailing edge is the edge of the label that exits the printer last; regardless of how the format is designed on the label.

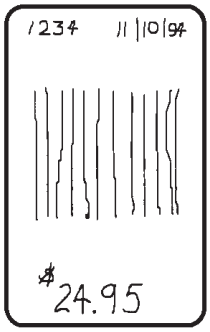
Use the following formulas to convert inches to dots and metric:

```
Dots = inches x 203 (or 300 dots per inch)
Metric (1/10mm) = inches x 254
English (1/100 inch) = 100 x (dots/203) or (dots/300)
Dots = Metric (1/10 mm) x 799/1000 (or 1181/1000)
300 dpi depends on your printer.
```

Drawing Rough Sketches

After you decide what information you want to print, sketch how you want the information to appear on the label. Note any areas that are preprinted on the label, such as a logo.

As soon as you know what information to include on the label, and you have a rough sketch, you can use a supply layout grid to help you layout and size your label. If you do not want to use a grid, go to “Considering Field Types” to choose what information you want on your label.



Using Supply Layout Grids

A supply layout grid contains measurement markers. These markers help you accurately position information on your label.

Decide whether you want to design formats using English, Metric, or Dot measurements. Choose from the following grids:

English

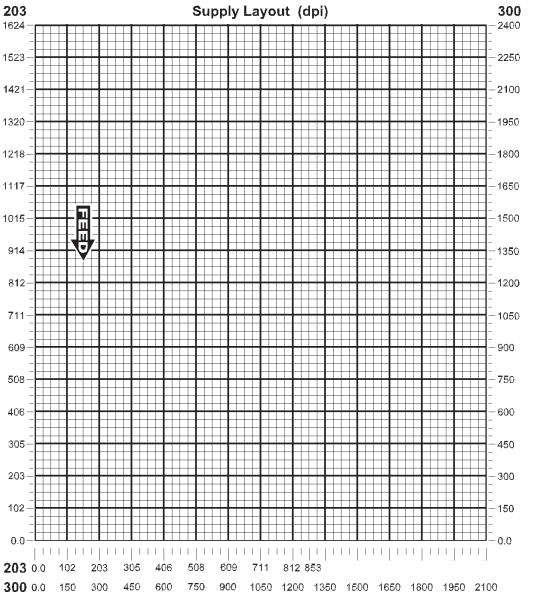
The English grid is measured in 1/100 inches.

Metric

The Metric grid is measured in 1/10 millimeters (mm).

Graphic

The printer uses dots to print images on a label. The printhead has 203 dots per inch (dpi) or an optional 300 dots per inch printhead depending on your printer.



Choose English or Metric units when designing formats to use with different printers. English or Metric units allow more direct use of formats on printers with different density printheads.

If you want to use the supply layout grids, a copy of each is in Appendix D, “Format Design Tools.”

Considering Field Types

After you select a supply size, the next step in designing a format is to decide what information you want to print on the label. For example, you may want to print your company name, price of an item, and a bar code that combines information from other places. Everything you want to print falls into one of the following categories.

Field Type	Description	Examples
Text	Contains letters, numbers, or symbols you want to print.	item number, item description, department number, price, date
Non-Printable Text	Holds data for use later, such as for merging into another field. The printer does not print non-printable text fields.	city, state, and zip code to be included in a bar code
Bar Code	Used for printing bar codes that can be scanned.	item or serial numbers, zip codes, information you don't want to have visible to customers
Constant Text	Prints fixed characters that print without changing.	company name, company address
Line or Box	Highlights or separates items.	line marking out the regular price, border around the supply
Graphic	Contains a bitmap image or a compliance label overlay.	logos
Verifier	Specifies a verifier configuration to use for each format.	mode 2, mode 19
RFID	Contains the RFID data you need to program into the RFID tag.	Class 1 Gen1, Class 1 Gen2, EPC data

All of the above field types except graphics are discussed in Chapter 3. See Chapter 5, "Creating Graphics" for information on including graphics in your format.

Considering Fonts

When working with fonts, you have three considerations: font appearance, font size (scalable or bitmapped), and font spacing (monospaced or proportional).

The TrueType® scalable font, EFF Swiss Bold (font 50) is standard on the printers. See Appendix B, “Fonts,” for samples of each font.

Interchanging Packets

You can use an MPCLII format that was designed for another MPCLII printer on a 9800 series printer. However, the format may appear smaller (fields will be shorter), because most of the 9800 series printers use a 203 dpi printhead. The 9855 and 9860 printers have an optional 300 dpi printhead.

Using the Format Worksheet

The Format Worksheet is divided into sections that list the field types. Each section has boxes to fill in with parameters that define your format. A format worksheet is included in Appendix D, “Format Design Tools.”

Filling in the Format Worksheet

Decide what type of field to use on your label.

1. Make a copy of the Format Worksheet.
2. Define the Format Header.
3. Define all non-printable text fields before you define the ones you want to print. See “Defining Non-Printable Text Fields” in Chapter 3 for more information.
4. Define options as you require them. See Chapter 4, “Defining Field Options” for more information.

CONFIGURING THE PRINTER 2

This chapter discusses how to

- set communication parameters.
- upload the printer's configuration or font information.
- configure the printer using online configuration packets.
- use immediate commands to control the printer's operation at any time.

Some parameters may not be available on each printer. See Appendix E, "Printer Differences," for a list of differences between all the printers.

Setting Communication Parameters

Use the following information if you are using serial communications. See "Using Parallel Communications" for information about parallel communications.

The communication parameters at the printer must match those at the host, or you will not be able to communicate.

You can use the communication settings packet to set communication parameters for your printer.

On MS-DOS computers, you can use the MODE command to set communication values on your PC.

For example

```
MODE COM1:9600,N,8,1
```

This command sets your host to these communication values: 9600 baud, no parity, an 8 bit word length, 1 stop bit.

Using Parallel Communications

If your printer supports parallel communications, the parallel port is IEEE-1284 or Centronics® mode. You can set which mode to use through the control panel. Refer to the *Quick Reference* for control panel information. The communication settings are automatically configured for you. There are no operator settings required.

We recommend waiting at least two seconds (or longer) when switching between the serial and parallel ports to send data, because data may be lost. Be careful when using print spoolers, because data transmission occurs in the background of the operating system. This makes data transmission completion difficult to determine when switching between ports.

Using MPCLII Conventions

Here are some guidelines to follow when using MPCLII.

MPCLII Punctuation

Use the following symbols when creating MPCLII packets:

Character	Decimal Value	Description
{ (left bracket)	123	start of header
} (right bracket)	125	end of header
¦ (vertical bar)	124	field separator*
, (comma)	044	parameter separator
“ABC” (quotation marks)	034	Quotation marks enclose character strings. Empty quotes (“”) identify null strings or unused fields.
'comment' (single quotation marks)	039	Grave accents enclose comments. Any data enclosed in grave accents is ignored. Do not embed comments within a quoted string. Grave accents are also used to reject mainframe data.

* The field separator is the split vertical bar, which we are representing as ¦ in this manual. The decimal value is 124. To enter this character, use the Shift key plus the Split Vertical Bar key on your computer’s keyboard. Depending on your text editor, it may appear as a solid vertical bar or as a split vertical bar.

Note: These MPCL characters are the default.

Standard Syntax Guidelines

When creating MPCLII packets:

Begin each packet with a **start of header** (**{**).

End each packet with an **end of header** (**}**).

Define no more than **1000** fields in a format. Each ¦ indicates one field. However, options are not counted as fields. The actual number of fields a format can have may be less, because the number of fields is limited by the available memory.

The field number (**0** to **999**) must be unique. We recommend starting at 1, instead of 0.

Do not use a field number more than once per format.

Define all fields in the order you want to image/print them. The printer does not print in field number order.

Separate all parameters with a **Parameter Separator** (**,**).

End each field with a **Field Separator** (¦).

Enter all information in CAPITAL letters, except words or phrases within quotation marks.

Include all parameters for a field unless documented as optional.

Define non-printable text fields before the field to which they apply.

Define options immediately after the field to which they apply.

Multiple options can be used with most fields. Options can be used in any combination except as noted with each definition. Options are processed in the order they are received.

Keep in mind that proportionally spaced fonts need wider fields than monospaced fonts. For variable field data, use a letter “W” to determine the maximum field size.

Do not place a new line (return) or any other non-printing character within a field definition. However, a carriage return or line break after each ¦ makes your formats easier to read.

```
T,1,20,V,30,30,1,1,1,1,B,C,0,0,0¦
T,2,10,V,50,30,1,1,1,1,B,C,0,0,0¦
```

Spaces are ignored, except within character strings.

Indenting options improves readability of your formats.

```
T,1,18,V,30,30,1,1,1,1,B,C,0,0,0¦
 R,42,1¦
```

Use a tilde (~) followed by a 3-digit ASCII code in a quoted string to send function codes or extended characters or send the 8-bit ASCII code.

You can modify formats and fields with the optional entry method. See “Optional Entry Method” in Chapter 6 for more information.

Using Online Configuration Packets

Use online configuration packets to change the printer's settings. You can send an individual configuration packet or a single packet containing all the configuration packets. Supply all parameters for each packet. Leave the parameters blank that you do not need to change. For example,

```
{ I,A,,,,1¦}
```

prints a slashed zero and uses the last sent *online* System Setup parameters.

Make a copy of the online configuration worksheet in Appendix D, "Format Design Tools," and save the original. Packets A-M are listed on the worksheet.

When you turn off the printer, all the information in the online configuration packets is saved and used when the printer is turned back on. After you change printer configurations, you must resend the format, batch, or graphic to the printer before the changes take effect.

Configuration Packet Header

Always include an **I**, immediately after the left bracket **{** and before the packet identifier (A, B, C, etc.). The **I** parameter identifies the data stream as a configuration packet.

Note: Include the **I** parameter with each packet if you are sending them individually. Include it only at the beginning of a data stream if you are sending multiple packets.

This is the syntax to use when you create online configuration packets:

Syntax

`{`	Start of Header
I,	Configuration Header
`1 - 8 optional records`	
`A, parameter 1...parameter 5¦`	System Setup
`B, parameter 1...parameter 5¦`	Supply Setup
`C, parameter 1...parameter 5¦`	Print Control
`D, parameter 1...parameter 3¦`	Monetary Formatting
`E, parameter 1...parameter 9¦`	Control Characters
`F, parameter 1...parameter 5 ¦`	Communication Settings
`G, parameter 1...parameter 4¦`	Backfeed Control
`M, parameter 1...parameter 4 ¦`	Memory Configuration
`}`	End of Header

Syntax for single packet

`{`	Start of Header
I,	Configuration Header
`A, parameter 1...parameter 5`	System Setup
`}`	End of Header

You can also add a configuration to RAM or specify units for supply, print, margin, and cut positions. If you use the optional parameters with the I packet, any online configuration packets following the split vertical bar (¦) must specify distances using the selected units. However, the test labels display the units in dots, even if you entered them in English or Metrics units.

Syntax `{header,ID#,action,device ¦}`

1. header Constant **I**.

2. ID# ID. Use **0**.

3. action Action. Options:
- **A** Add configuration.
- **U** Upload User Configuration.

4. device Storage Device. Use **R** (Volatile RAM).

5. units Units. (Optional parameter.) Options:

E English
M Metric
G Dots

Example

```
{I,0,A,R,E¦
C,0,25,0,0,0¦}
```

Adds a configuration to volatile RAM and specifies English units. It also uses the default contrast, moves print 0.25 inches closer to the bottom of the supply and does not change the margin adjustment, prints at the default print speed, and uses the default printhead width.

If you do not use the optional parameters, the syntax for the online configuration packets does not change. For example,

```
{I,C,0,50,0,0,0 ¦}
```

uses the default contrast, moves print 50 dots (0.25) inches closer to the bottom of the supply and does not change the margin adjustment, prints at the default print speed, and uses the default printhead width.

Example

```
{I,0,U,R¦ }
```

Uploads the printer configuration from volatile RAM and returns the following to the host.

```
A,0,0,0,1,0¦
B,1,1,0,0,0¦
C,0,0,0,0,0,0¦
D,1,0,2¦
E,"~123~044~034~124~125~126","","~013~010"¦
F,3,1,0,0,1¦
G,0,65,65¦
M,R,76365,45190,N,0,0¦
M,R,R,640¦
M,T,R,640¦
M,I,R,3300¦
M,D,R,640 ¦
M,F,R,1280 ¦
M,V,R,3840¦
```

The parameters for each packet (**A-M**) are displayed. In the first line that begins with **M**, 76365 is the total volatile memory available, 45190 is the memory available in volatile RAM. There is no non-volatile RAM available. The remaining lines beginning with **M** list the buffer sizes in 1/10K for the Receive, Transmit, Image, Downloadable Fonts, Formats, and Scalable Fonts Buffers.

Configuration Syntax Guidelines

When creating a printer configuration packet:

- Follow the “Standard Syntax Guidelines” listed at the beginning of this manual.
- The first character after the **start of header** (**{**) is the **configuration header** (**I**).
- Download multiple configuration packets within one packet or download a single configuration packet.
- If you change any of the online configuration packets, resend the format packet to the printer, so the configuration changes take effect.
- Include the first five ANSI codes, at a minimum, in the control characters packet.
- Send configuration packets once per session (each time the printer is turned off and then back on), not with every format or batch packet.

Making Print Adjustments

You can adjust where the printer prints on your supply by adjusting the supply, print, or margin positions. However, keep in mind the following:

- Supply adjustments across the width of your supply, such as the margin position, are based in dots- either 203 dpi or 300 dpi, depending on your printhead density.
- Supply adjustments for the length of your supply, such as supply position or print adjustment, are always measured in 1/203 of an inch, regardless of your printhead density.

Defining the System Setup Packet

Use the system setup packet (A) to select the power up mode, display language, print separators between batches, print a “slashed zero,” and select the symbol set.

Syntax `{I,A,powup_mode,language,sep_on,slash_zero,symbol_set}`

A1. A System Setup Packet

A2. powup_mode Online Mode. Options:

- **0** online mode (default)
- **1** offline mode (9855/9860).

A3. language Display Language. Options

- **0** English (default)
- **1** French
- **2** German
- **3** Spanish - ES
- **4** Japanese
- **5** Portuguese
- **6** Italian
- **7** Swedish
- **8** Spanish2 - MX
- **9** Danish
- **10** Dutch
- **11** Finnish
- **12** Norwegian

A4. sep_on Batch Separators. Options:

- **0** Does not print a separator (default)
- **1** Prints a separator
- **2** Double-length separator- prints 2 tags (9855/9860)

Note: Do not use batch separators with continuous (non-indexed) supply or RFID supply. If using a stacker, the batch separator is 3.66 inches long.

A5. slash_zero Slash Zero. Options:

- **0** Print a standard zero (default)
- **1** Print a zero with a slash through it

A6. symbol_set Symbol Set. Options:

0	Internal (default)
1	ANSI
2	Code Page 437 (Latin U.S.)
3	Code Page 850 (Latin 1)
4	Code Page 1250 (Latin 2)
5	Code Page 1251 (Cyrillic)
6	Code Page 1252 (Latin 1)
7	Code Page 1253 (Greek)
8	Code Page 1254 (Turkish)
9	Code Page 1255 (Hebrew)
10	Code Page 1256 (Arabic)
11	Code Page 1257 (Baltic)
12	Code Page 1258 (Vietnamese)
13	DOS Code Page 852 (Latin 2)
14	DOS Code Page 855 (Russian)
15	DOS Code Page 857 (IBM Turkish)
16	DOS Code Page 860 (MS-DOS Portuguese)
17	Wingdings
18	Macintosh
19	Unicode
20	BIG5
21	GB2312
22	SJIS (Shift JIS) to SJIS (Code Page 932, Japanese)
23	GB2312 to GB2312 (Code Page 936, Simplified Chinese)
24	BIG5 to BIG5 (Code Page 950, Traditional Chinese)

Note: The Standard, Reduced, Bold, OCRA and HR fonts only support the Internal Symbol Set (0). The CG Triumvirate™ typefaces only support the ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font does not support Code Page 1256 (Arabic). Code pages 852-860 and 1250-1258 may only be used with downloaded TrueType® fonts or the scalable font. Symbol sets 19-24 require the memory expansion option and a downloaded International TrueType font. TrueType fonts are designed to be regionally specific; therefore, all code pages may not be supported in a given font. See Appendix C for more information.

Example `{I,A,0,0,1,1,0¦ }`

Powers up the printer in the online mode, displays prompts in English, prints a separator after each batch, prints zeros with slashes through them, and uses the internal symbol set.

Defining the Supply Setup Packet

Use the supply setup packet (B) to select supply type, ribbon, feed mode, supply position, and cut position.

Syntax

```
{I,B,supply_type,ribbon_on,feed_mode,supply_posn,
cut_posn,skip_index¦}
```

B1. B Supply Setup Packet

B2. supply_type Supply Type. Options:

- **0** Black mark supply
- **1** Die Cut/edge aperture supply (default)
- **2** Continuous (non-indexed) supply
- **3** Center Aperture supply (9855/9860)
- **4** Reserved
- **5** Tag Edge Aperture (9855 RFID)

Note: You must use continuous supply in continuous mode. Do not use continuous supply with extended backfeed or 94x5 emulation. If your aperture supply has holes on the edge, use **1**. If your aperture supply has holes in the center, use **3**. If your aperture supply has holes on the edge **and** contains an RFID antenna, use **5**.

B3. ribbon_on Ribbon. Options:

- **0** Ribbon not installed
- **1** Ribbon installed (default)
- **2** High Energy Ribbon installed (9855/9860)

You must use a print speed of 2.5 IPS with the high energy ribbon. Serial bar codes cannot be printed using the high energy ribbon. Settings for ribbon and supply type must match the supplies loaded in the printer; otherwise, an error occurs. To clear the error, turn off the printer and change the configuration packet. Turn on the printer and resend the packet.

B4. feed_mode Feed Mode. Options:

- **0** Continuous operation (default)
- **1** On-demand mode

B5. supply_posn Supply Position. Range: **-300** to **300** in 1/203 inch. 0 is the default. Adjusts the machine to print at the vertical 0,0 point on the supply. This adjustment accounts for mechanical tolerances from machine to machine. The supply position adjustment only needs to be made on the initial machine setup. Adjust the supply position if formats do not start at the 0,0 point on the supply. Increase the supply position to move print up, decrease to move print down on the label. To verify the 0,0 point, print a test label. See "Printing a Test Label" in Chapter 8 for more information.

For the RFID printer, adjust the supply position according to the RFID Setup Guide and Supply Chart.

You can not change the supply position while the printer is active. Changing the supply position will affect the print position, dispense position, and backfeed distance. Once the supply position is set, use the print control packet and backfeed control packet to adjust printing and the dispense position.

B6. cut_posn Cut position. Range: **-300** to **300** in 1/203 inch. Use **0** for the 9825. Adjusts where the tag is cut. The printer adjusts the cut position according to the black marks on the supply. You may need to adjust for aperture supplies. Increase to move the cut up, decrease to move the cut down.

Note: We do not recommend setting a positive cut position for any supply while using extended backfeed. You may cut off the leading edge of the next tag.

B7. skip_index Skip index mode. The 9825 printer does not support skip index mode. If using RFID supplies, do not use skip index mode. Options:

0 Disable skip index mode (default)
1 Enable skip mode. Allows the printer to skip a sense mark and print an image over multiple labels.

Example `{I,B,0,0,1,10,50,1¦}`

Indicates black mark and thermal direct stock has been loaded, causes the printer to operate in on-demand mode, feeds the supply approximately .05 inches up before printing the format on each label (10/203 inches), feeds the supply .25 inches (50/203 inches) before cutting, and enables skip index mode.

Defining the Print Control Packet

Use the print control packet (c) to set the contrast, print, and margin adjustment, print speed, and printhead width.

Syntax `{I,C,contrast,print_adj,margin_adjust,speed_adj,ph_width¦}`

C1. C Print Control Packet

C2. contrast Print Contrast. Range: **-699** to **699**. 0 is the default.

C3. print_adj Print adjustment (position). Range: **-99** to **99** (9825) or **-450** to **450** (9855/9860) in 1/203 inch. 0 is the default. Adjusts where data prints vertically on the supply. Increase the print position to move print up, decrease to move print down.
For the RFID printer, adjust the print position according to the *RFID Setup Guide and Supply Chart*.

C4. margin_adj Margin adjustment (position). Range: **-99** to **99** in 1/203 inch (or 1/300 inch for 9855/9860). 0 is the default. Adjusts where data prints horizontally on the supply. Increase the margin position to move print to the right, decrease to move print to the left. Margin and print position are format adjustments. They will not effect the supply position, dispense position, or backfeed distance.

C5. speed_adj Print Speed in inches per second (ips). Options:

0	Default (formats with serial bar codes automatically print at 2.5 ips)
25	2.5 ips (default for serial bar codes)
40	4.0 ips
60	6.0 ips (default)
80	8.0 ips (9855/9860)
100	10.0 ips (9855 with 203 dpi)
120	12.0 ips (9855 with 203 dpi and high speed option)

Note: Serial bar codes with an 8-dot narrow element do not automatically print at 2.5 ips. Serial bar codes printed at speeds greater than 2.5 ips may not scan properly. However, the 985x and 9860 printers can print 203 dpi serial bar codes with narrow elements of 3 dots (or greater) at 4.0 ips. You must use a print speed of 2.5 ips with the high energy ribbon. See “Special Printing Considerations,” in Chapter 6 for more information.

C6. ph_width Width of the printhead in dots. Use **0**.

Example {I,C,0,-20,-10,0,0¦}

Uses the default contrast, moves print 0.1 inch closer to the bottom of the supply (20/203 inches) and .05 inch to the left on the supply (10/203 inches), prints at six inches per second, and uses the default printhead width.

Defining the Monetary Formatting Packet

The monetary formatting packet (D) selects the monetary symbols to print for a price field. Use the monetary formatting packet to select primary and secondary monetary symbols, and designate the number of digits to appear at the right of a decimal.

Syntax {I,D,cur_sym,secondary,decimals¦}

D1. D Monetary Formatting Packet

D2. cur_sym Currency Symbol. Options:

- **0** No symbol
- **1** USA ($, Dollar- default)
- **2** UK (£, Pound)
- **3** Japan (¥, Yen)
- **4** Germany (DM, Deutsche Mark)
- **5** France (F, Franc)
- **6** Spain (P, Peseta)
- **7** Italy (L., Lira)
- **8** Sweden (Kr, Krona)
- **9** Finland (MK, Markka)
- **10** Austria (Sch, Shilling)
- **11** India (Rs, Rupee)
- **12** Russian (Rb, Ruble)
- **13** Korean (₩, Won)
- **14** Thai (฿, Baht)
- **15** Chinese (¥, Yuan)
- **16** Euro-Dollar (€

Note: To use these symbols, select the internal symbol set.

D3. secondary Secondary Sign. Secondary symbols only print if you designate at least one decimal place. Options:

- **0** No secondary sign (default)
- **1** Print secondary sign

D4. decimals Number of digits to the right of the decimal. Options:

0	No digits
1	One digit
2	Two digits (default)
3	Three digits

Example `{I,D,1,1,2¦}`

Prints the dollar sign, uses a secondary symbol, and places two digits to the right of the decimal.

Defining the Control Characters Packet

Use the control characters packet (E) to change the MPCLII control characters, enable and disable the immediate commands, and change the default terminator character for job requests and ENQ's.

Changes take effect with the first character following the end of header character **}** of the configuration packet. Each control character must be unique and cannot appear anywhere else in your packet, except within quotation marks. You can customize the trailer characters to work with your host.

Note: Wait two seconds for the new characters to take effect before sending packets using the new characters.

If using symbol set 110 (Unicode UTF-8) to print International characters, set the MPCL control characters (start of header, etc.) to decimal values between **0** and **128**; otherwise, errors may occur with the Unicode data entered.

Use the following syntax for the control characters packet. Notice all but the first parameter are within quotation marks.

Syntax {**I**,E,"ANSI_cd","string1","string2"¦}

E1. E Control Characters Packet

E2. "ANSI_cd"

~123	Start of header	{	(left bracket)
~044	Parameter separator	,	(comma)
~034	Quoted strings	"	(quotes)
~124	Field separator	¦	(pipe sign)
~125	End of header	}	(right bracket)
~126	Data escape character (optional)	~~	(double tilde)

def. ch. Immediate command character (optional). Up to any 3 characters in the **0** to **255** decimal range. The character must be defined before this command can be used. The caret (~094) is normally used.

Note: "ANSI_cd" includes seven separate parameters. The first five parameters are required. The other parameters are optional.

E3. "string 1" Terminator for status requests and ENQ requests. Up to any 3 characters in the **0-255** decimal range. The default is "013". Sending "" disables this sequence.

E4. "string 2" Terminator for job requests and data uploads. Up to any 3 characters in the **0-255** decimal range. The default is none. Sending "" disables this sequence.

After you change these parameters, all packets, including any future configuration packets, must use the new control characters. We recommend using the tilde and ASCII character code sequence when sending this packet multiple times. Also, set the packet delimiters to characters within the 21 hex to 7E hex range.

You must send the control characters packet to enable the immediate commands. An immediate command executes immediately, even if it is embedded within quotation marks, and all data following the command in the string is ignored.

Example {**I**,E,"~123~063~034~124~125~126~094"¦}

Changes the parameter separator character from , to ?. The other control characters remain unchanged. It also enables the immediate commands by defining the ^ symbol as the command identifier.

Resetting Control Characters

You can change the characters in the previous example back to their original settings by downloading this packet:

```
{I?E?"~123~044~034~124~125~126~094"¦ }
```

Notice that the parameter separator is ? in this packet. This is the parameter separator that was set before this packet. Once the packet is received by the printer, the new parameter separator (a comma, in this case) is valid.

Be careful when using this feature. If you forget what the control characters were changed to, print a test label. (The test label lists the current control characters.) See “Printing a Test Label,” in Chapter 8 for more information.

Using Immediate Commands

Immediate commands effect printer operation as soon as the printer receives them, even if they are included within a packet or used inside quotation marks.

You can use immediate commands to change immediate command or status polling control characters, reset the printer, or cancel and repeat batches.

Enabling Immediate Commands

When the printer is first turned on, these commands are not available. To use these commands, you must first send the control characters packet and define the immediate command control character. The immediate command control character is saved in non-volatile RAM so it is not lost after you turn off the printer. Once the immediate command control character is defined, the immediate commands are enabled.

Sending Immediate Commands

Immediate commands consist of a three- or four-character sequence you can send in a packet or embed in your application. Each command must be sent separately.

Syntax `control character_immediate command`

The printer can accept only one immediate command at a time. Sending a command before the previous one is completed can result in an error.

Example `^CB`

Immediately cancels the batch currently printing unless an error exists in the printer. This example assumes that the defined immediate command control character is the caret (^).

Command	Parameter
^CA	Cancels all the batches in the queue unless an error exists on the printer.
^CB	Cancels only the current batch being printed unless an error exists.
^DD or ^DCd	Disables the MPCL data escape character (the tilde) and inhibits MPCL from acting on ANY data escape sequence from the host. Sets the MPCL data escape character to the ASCII value given by the **d** parameter. The value can be any ASCII character.
^EA	Aborts an error condition. This command is the same as pressing **ESCAPE/CLEAR** to clear an error. May need to be sent multiple times. Use ^RB to reprint batch. **CAUTION:** This command causes the current batch to stop and the condition that caused the error to remain uncorrected.
^ER	Resets the error. This command is the same as pressing **FEED/CUT** to acknowledge an error. Normal operation resumes.
^FD	Feeds a label when printer is idle. Simulates the operation of pressing **FEED/CUT** and dispenses the next label if printer is in the on-demand mode. **Note:** Printer ignores this command if printing.
^FF1	Formats flash memory
^FF2	Returns the amount (in bytes) of the available flash memory.
^GD	Disables the conversion of formats designed in 203 dpi dot units to 300 dpi.
^GE	Enables the conversion of formats designed in 203 dpi dot units (not English or Metric) to 300 dpi.
^ID or ^ICd	Disables the Immediate Command feature by turning off the Immediate Command escape character. Sets the Immediate Command escape character to the ASCII value given by the **d** parameter. The value can be any ASCII character. Use ^IE to enable immediate commands.
^MC	Returns the customer ID or RPQ version to the host. (**00** to **99**)
^MD	Returns the printhead dot density to the host. **00** = 203 dpi **01** = 300 dpi
^MI	Returns the customer ID or RPQ revision level to the host. (**00** to **99**)
^MM	Returns the model number to the host. **17** = 9825 **18** = 9855 **19** = 9860
^MP	Returns the prototype number to the host. (**00** to **99**)
^MR	Returns the revision number to the host. (**00** to **99**)
^MV	Returns the version number to the host. (**00** to **99**)
^PR	Resets the printer. This command takes five seconds to complete and then the printer is ready to receive data. It has the same effect as turning off and then turning on the printer. **Note:** Command should be used only when the printer is **not** printing.

Command	Parameter
^RB	Repeats the last printed batch, printing the same number of labels as specified in the original batch. This command does not work if using batch separators. **Note:** Printer ignores this command if printing.
^RS	Resynchronizes supply when supply roll is changed. **Note:** Printer ignores this command if printing.
^SD or ^SCd	Disables the status polling feature by turning off the status polling control character. Sets the status polling control character to the ASCII value given by the **d** parameter. The value of d can be any ASCII character.
^SFa	Loads script with host response.
^SFb	Loads script without host response.
^SFc	Enables script.
^SFd	Disables script.
^SFe	Uploads script version information.
^SFf	Deletes script.
^SFg	Turns on ENQ status polling before it reaches the script.
^SFh	Turns off ENQ status polling before it reaches the script.
^SFi	Turns on immediate commands before it reaches the script.
^SFj	Turns off immediate commands before it reaches the script.
^TP	Prints a test label. **Note:** Printer ignores this command if printing.
^VLC	Only clears the data that has been uploaded, not all the logged data. Data is cleared with this command after a successful upload. We recommend clearing the log file after uploading.
^VLD	Disables verifier data logging (default when the printer is reset).
^VLE	Enables verifier data logging.
^VLU	Uploads the log file to the last port that received host data (serial, parallel, USB, or Ethernet). Repeat this command until data is successfully uploaded. Data can be cleared after it has been uploaded.

The table represents the defined immediate command control character as **^** and the defined status polling control character as **d**. You may define these characters to suit your needs.

Note: To use the immediate command control character or the status polling character within your data, use the tilde sequence.

Defining the Communication Settings Packet

Use the communication settings packet (F) to set the baud rate, word length, stop bits, parity, and flow control for serial communications. To set parallel communications, see "Using Parallel Communications."

Changing the communication settings takes approximately two seconds. Communications sent during this interval will be lost. Make sure the host communication values match the values on the printer and the host is capable of communicating at the speed you select for the printer.

Do not add any characters, such as a carriage return/line feed, in your communication settings packet or communications errors may occur.

Syntax

```
{I,F,baud,word_length,stop_bits,parity,
flow_control¦}
```

F1. F Communication Settings Packet

F2. baud Baud Rate. Only the 9855 and 9860 printers support baud rates greater than 38400. Options:

0	1200	**1**	2400
2	4800	**3**	9600 (default)
4	19200	**5**	38400
6	57600	**7**	115200.

F3. word_length Word Length. Options:

0 7-bit word length
1 8-bit word length (default)

F4. stop_bits Stop Bits. Options:

0 1-stop bit (default)
1 2-stop bits

F5. parity Parity. Options:

0 None (default)
1 ODD parity
2 EVEN parity

F6. flow_control Flow Control. Options:

0	None	**2**	(CTS)
1	DTR (default)	**3**	XON/XOFF

Note: If you use the DOS COPY command to download your formats, set "Flow Control" to **DTR** (not XON/XOFF).

Example {**I**,F,3,1,0,0,1¦}

Uses 9600 baud, an 8-bit word length, one stop bit, no parity, and the DTR mode.

Defining the Backfeed Control Packet

Use the backfeed control packet (G) to enable or disable the backfeed option, set the dispense position and the backfeed distance. Backfeed works by advancing each printed label to the desired dispense position. Once that label is removed, the next label to be printed is backed up underneath the printhead. In continuous mode, only the last label in the batch is advanced to the dispense position. You may need to adjust the dispense position to allow labels to be removed, die cut labels to be removed easily, or to prevent them from falling off.

Extended backfeed is available on the 9855 printer with a knife installed. Extended backfeed feeds a tag far enough out to be cut and backfeeds the next tag to the printhead line. You can not change the backfeed distance while the printer is active.

Extended backfeed eliminates printed tags being left between the printhead and knife. Extended backfeed **does not** work with non-indexed (continuous) supply/mode. **We do not recommend using extended backfeed when sensing on attacher-hole supplies.**

The 9860 printer automatically backfeeds when necessary. Backfeed is also cut-mode dependent. See “Defining the Batch Control Field” in Chapter 6 for more information about the best cut mode for your application.

Do not use backfeed (normal or extended) with supplies less than 0.75 inches. We recommend using 0.5-inch gap supplies in peel mode when backfeed is disabled.

The dispense position and backfeed distance are optional parameters and do not have to be specified. However, they allow for greater precision when positioning the supply.

Syntax {**I**,G,action,dis_pos,bkfd_dis¦ }

G1. G Backfeed Control Packet

G2. action Action. If using one-inch RFID Supplies, do not use backfeed. Options:

- **0** disable backfeed (default)
- **1** enable backfeed (use on any printer without a knife)
- **2** enable extended backfeed (use on any printer with a knife)

Note: We do not recommend setting a positive cut position for any supply while using extended backfeed. You may cut off the leading edge of the next tag.

G3. dis_pos Dispense Position. Adjusts the stopping point of the label. **50** to **200** dots (default 65 dots). Use 95 dots for the printer applicator.

G4. bkfd_dis Backfeed Distance. Amount to move label backwards. **10** to **200** dots (default 65 dots). Use 95 dots for the printer applicator. This distance can not be greater than the dispense position.
The backfeed distance should equal the dispense position. An exception is if you are tearing instead of peeling. Then, the backfeed distance must be 30 dots (.150 inches) less than the dispense position. However, you will have a 30 dot non-print zone on your supply. The 30-dot difference accounts for improper tearing of butt cut supplies, because you do not want any exposed adhesive under the printhead.

Example {**I**,G,2¦}

Enables extended backfeed and cuts any tags remaining between the knife and printhead and moves the supply backwards so the next tag is underneath the printhead. Using cut mode 4, you do not have to press **FEED/CUT** to cut the last tag.

Example {**I**,G,1,50,10 ¦}

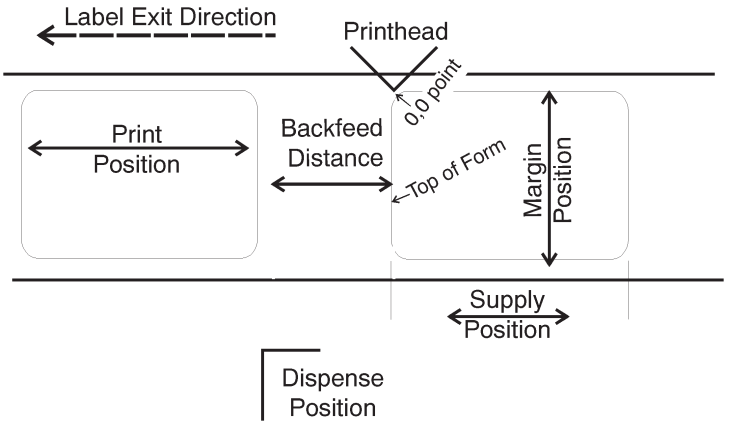
Enables backfeed and sets the dispense position to 0.25 inches (50/203) and the backfeed distance to 0.05 inches (10/203).

Special Considerations When Using Backfeed

Make a note of the following items:

- Be careful when tearing supplies, because the adhesive can adhere to the printhead or platen roller.
- Backfeed affects each label in the on-demand mode or the first and last label of the batch in continuous mode.
- When backfeed is enabled and multiple batches are sent, the printer may not backfeed between each batch.
- Backfeed should only be used when you need to advance labels to the desired dispense point.
- Backfeed does not interfere with the supply, print, or margin positions you have set.
- If the supply inter-label gap is not between .07 inch to .15 inch (14 to 30 dots), you must adjust the dispense position and backfeed distance accordingly.

See the following graphic for a representation of the following adjustments: dispense position, backfeed distance, supply position, print position, and margin position.



Contact Technical Support if you have problems adjusting where the format prints on the supply.

Defining the Memory Configuration Packet

Use the memory configuration packet (M) to customize the size of your printer's buffers, which gives you greater flexibility in your formats.

Memory must be allocated in 1/2K increments. The memory configuration packet does not accept decimals, so enter whole numbers. Multiply the amount to reallocate (in K) by 10. For example,

To reallocate (in K)	Enter this amount
1	10
1.5	15
2	20
2.5	25
153	1530
229.5	2295

Each buffer's allocated memory remains in effect until that buffer is reallocated. For this reason, you may want to reallocate all the buffers when reallocating any buffer. If you reallocate more memory than you have available, you will receive an error.

Syntax `{I,M,buffer,device,buffer_size ¦}`

M1. M Memory Configuration Packet

M2. buffer Buffer type. Options:

- **D** Downloadable Fonts
- **F** Format
- **I** Image
- **R** Receive
- **T** Transmit
- **V** Scalable (vector) fonts

M3. device Storage type. Options:

- **F** Flash Memory
- **R** Volatile RAM

Note: You cannot reallocate flash memory.

M4. buffer size Buffer size in 1/10K ranges. The following table lists the configured buffer sizes and min-max values for your printer. The printer's configuration is stored in non-volatile RAM and retained when you turn off the printer. The max. value for each buffer is listed; however, the sum of all the buffers cannot exceed the max. available memory of the printer.

Buffer	Type	9825*	9855/9860
Transmit	Volatile	2K (.5K- 4K)	64K (.5K- 128K)
Receive	Volatile	8K (2K- 64K)	64K (2K- 128K)
Image	Volatile	330K (41.5K- 640K)	330K (41.5K- 6144K)
Downld. Fonts	Volatile	64K (8K- 640K)	64K (8K- 8192K)
Scalable Fonts	Volatile	64K (32K-640K)	384K (32K-8192K)
Formats	Volatile	64K (16K- 640K)	128K (16K- 1024K)
Internal	NA	cannot reallocate	cannot reallocate

* The 9825, 9855, and 9860 printers do not have non-volatile RAM; however, you can store formats, fonts, and graphics in flash memory. Change the storage device of your packets to "F" instead of "N."

Use the following table to see how much memory is available to reallocate.

RAM*	9825	9855/9860
Volatile RAM	1 Meg	8 Meg

* You cannot reallocate more memory than what is available, or you will receive an error. Memory expansion is an option available on the 9855 and 9860 printers.

Example

```
{I,M,I,R,1530 ¦}
```

Stores the image buffer in volatile RAM and allocates 153K for it.

Checking Current Buffer Sizes

Send a configuration upload packet to check the sizes of your current buffers. See “Configuration Packet Header” for more information. After you check your current buffer sizes you can begin reallocating memory.

If you want to increase your image buffer and you will not be using scalable fonts, add that memory into your image buffer.

Example

{**I**,M,R,R,20¦	Receive buffer	2K
M,T,R,10¦	Transmit buffer	1K
M,D,R,80 ¦	Downloadable fonts	8K
M,V,R,160 ¦	Scalable fonts buffer	16K
M,I,R,3200¦}	Image buffer	320K

Make sure memory is available before adding memory to a buffer. In the above example, if the image buffer (M,I,R,3200) was defined before the downloadable fonts and scalable fonts buffers (M,D,R,80 and M,V,R,160) were defined, an error would have occurred.

About Memory Buffers

Transmit Buffer Used to send ENQ, job, and upload responses. This buffer must be allocated as volatile (**R**) RAM.

Receive Buffer Used to save data received from the host before it is processed by the printer. Changing this buffer size affects the amount of data the printer can receive without using flow control. This buffer must be allocated as volatile (**R**) RAM.

Image Buffer Used to image the current format. The printers support two 4-inch by 8-inch buffers. You can create an image up to 16 inches long without reallocating memory. The Image Buffer is cleared after a printer reset.

Use the formula below to calculate the approximate image buffer size.

`21K x Length` (for 203 dpi) OR
`46K x Length` (for 300 dpi)

Length is the length of your label in inches.

203 DPI Example `21K x 25 = 525`

(Multiply by 10 and round up to the next whole number if necessary)

`525K x 10 = 5250`

Enter 5250 for your Image buffer.

300 DPI Example `46K x 26.75 = 1230.5`

(Multiply by 10 and round up to the next whole number if necessary)

`1230.5 x 10 = 12305`

Enter 12305 for your Image buffer.

Format Buffer

Used to store formats, batch data, and graphics. Use the following formula to calculate the required format buffer size:

`Linecount x 50/1024`

Linecount is the number of lines in your format packet including the format header and all the options.

The result of the above calculation is in kilobytes. Formats remain in memory when you turn off the printer.

Downloadable Fonts Buffer

Used to store downloaded soft (bitmapped or TrueType) fonts. To determine the size of your downloadable fonts, send a font packet. For TrueType fonts, the file size, in bytes, is the minimum amount needed in this buffer. See “Using the Font Packet” for more information.

Scalable (Vector) Fonts Buffer

Used to image the scalable or downloaded (TrueType or bitmapped) font characters. Increasing this buffer size allows more characters to be saved in cache memory, so the characters do not have to be re-built the next time they are printed. Use **0** if you are not using scalable/TrueType fonts. This buffer must be allocated as volatile (**R**) RAM.
The printer does not print the fonts if there is not enough memory in this buffer to image them.

Buffer Worksheet

Make copies of this page to use as a buffer worksheet.

	HEADER	BUFFER	DEVICE	BUFFER SIZE
DOWN LOADABLE FONTS BUFFER	M	D		
FORMAT BUFFER	M	F		
IMAGE BUFFER	M	I		
RECEIVE BUFFER	M	R	R	
TRANSMIT BUFFER	M	T	R	
SCALABLE FONTS BUFFER	M	V	R	

Buffer Allocation Considerations

Keep these items in mind when allocating memory.

Do not allocate more memory than what is available.

Free memory from one buffer *before* you add it to another buffer.

Reallocate all the buffers if you need to reallocate any buffer.

Send all buffer (re)allocations in one packet. The printer evaluates each individual buffer allocation separately. If one buffer allocation is invalid, the entire packet is invalid. If you define a buffer size that exceeds the maximum value, an error occurs. However, no information is lost.

Whenever the printer accepts a memory configuration packet, it takes effect immediately, causing a printer reset. Any information contained in the buffers is lost. Resend your formats, batches, graphics, or fonts to the printer.

If you remap your image buffer, make sure the length and width specified in your format header are not too large for the current image buffer. In other words, if you remap for a 4 x 4 inch label, you cannot print a 4 x 6 inch label without receiving an error, until you change your format header or increase your image buffer.

Memory Considerations with Downloaded TrueType Fonts

The size of the TrueType font file, in bytes, is the minimum amount of memory you must have available in the downloadable fonts buffer.

The scalable (vector) fonts buffer is used to image the downloaded fonts (TrueType). If you are using several downloaded TrueType fonts, you may need 100K or more in this buffer. The printer does not print the fonts if there is not enough memory in the scalable (vector) fonts buffer.

To use large point sizes (greater than 60 point), you must reconfigure memory and increase the size of the scalable (vector) fonts buffer.

Font storage is limited on the 9825 printer, because there is no extended memory available.

Formatting Flash Memory

Before you send packets to flash memory, it must be formatted first. **This is required once during initial printer setup**. From the Main Menu, select Setup, Flash Memory, then Format Flash. The process takes a few minutes.

Note: When you format flash memory, all packets (formats, fonts, graphics, etc.) stored in flash memory are deleted and must be resent to the printer.

Flash Memory Guidelines

Use these basic guidelines for storing files in flash memory.

Your printer may have volatile RAM (packets deleted when the printer is turned off), non-volatile RAM (packets saved when the printer is turned off), and flash memory (packets saved when the printer is turned off). Each printer has a different limit of available memory.

Before you save any packets in flash memory, you must format flash memory first. See “Formatting Flash Memory” for more information.

Formats, graphics, and check digits can be saved in flash (but they are also duplicated in RAM). Any packets saved in flash cannot exceed the memory available in RAM.

Packets with the same number should not be added to flash memory. If two packets with the same number are stored in flash, only the last packet sent can be used. For example, if you send the following packets to flash memory, only the “Textiles” format can be used.

```
{F,10,A,F,E,300,200,"UPC"¦}
{F,10,A,F,E,300,200,"Textiles"¦}
```

Fonts are stored differently in flash. For example, the 9825 printer has very limited flash font memory and one TrueType font may exceed that limit. For TrueType or double-byte fonts, use a 9855 or 9860 printer with the memory expansion option.

There is not a 1-to-1 ratio between the memory in your printer and the memory in your PC. For example, a file that is 5K in Windows may require 15-20K to store in your printer.

When using graphics, use the lowest-resolution graphic possible. If your printer uses a 203 dpi printhead, the graphic’s resolution should be 150 to 200 dpi. In fact, 96 dpi may work. Try to create the smallest file size possible.

Use temporary storage for graphics that are only used once or twice. However, if you have a logo that is used on multiple formats, save the graphic in flash. Once again, try to create the smallest file size possible for your graphic.

Each line in a packet requires the same amount of memory. The smaller the format, the less memory required to save it.

Flash memory cannot be reallocated.

Clearing Packets from Memory

You may want to remove packets from the printer to increase memory storage capacity or if the formats/fonts are no longer needed. In some cases, turning the printer off may clear the packets from memory. If not, send a format clear packet.

Syntax `{header,packet#,action,device ¦}`

1. header Identifies the packet. Options:
- **A** Check Digit Scheme
- **F** Format
- **G** Graphic
- **W** Font

2. packet# Identification number of the packet to clear (**1** to **999**) or font number (**0** to **9999**). **0** is for all fonts.

3. action Action. Enter **C** to clear the packet.

4. device Storage device. Options:
- **F** Flash
- **R** Volatile RAM

Example `{F,1,C,R ¦}`

Clears Format #1 from volatile RAM.

Using the Font Packet

You can use a font packet to add or clear downloaded fonts from memory, upload your font buffer, or upload the cell size information for a particular font. The font packet is useful when you are downloading fonts. If you are using downloaded fonts, the font number and the number of bytes each downloaded font uses is listed.

This packet does not list the number of bytes the standard printer fonts use.

Use the MONARCH® MPCL Toolbox **Font Utility** (available on our Web site) to create the font header and data. Refer to the online help for more information.

Syntax `{W,font#,action,device,data_length,data_record¦}`

W1. W Writable Font Header.

W2. font# The font identifier from **0** to **9999**.
0 is for all fonts. 1 - 5 digits is the font number.
Example: 3 is the standard printer font, Bold.

W3. action Action. Options:
A Adds the specified font.
C Clears all or specified fonts, except ones in flash.
H Uploads font size information.
M Uploads font memory usage information.

Note: C does not clear (erase) fonts saved in the printer's flash memory. You must format flash memory to erase fonts from the printer's flash memory. However, when you format flash memory, ALL fonts saved in the printer's flash memory are deleted.

W4. device Device. Options:
F Flash
R Volatile RAM
Z All devices (use for upload).

W5. data_length (optional) The length of the font data. The range is **68** to **16384**.

If you are creating fonts, you need to have font data included with this packet.

W6. data_record (optional) Multiple data records define the font. The first character is either an **H** (hex) or an **R** (run-length), referring to the algorithm. The rest of the record is up to 2710 characters of font data in double quotes. Separate the algorithm and the data with a comma, and end the record with ¦.

Example `{W,0,M,R ¦ }`

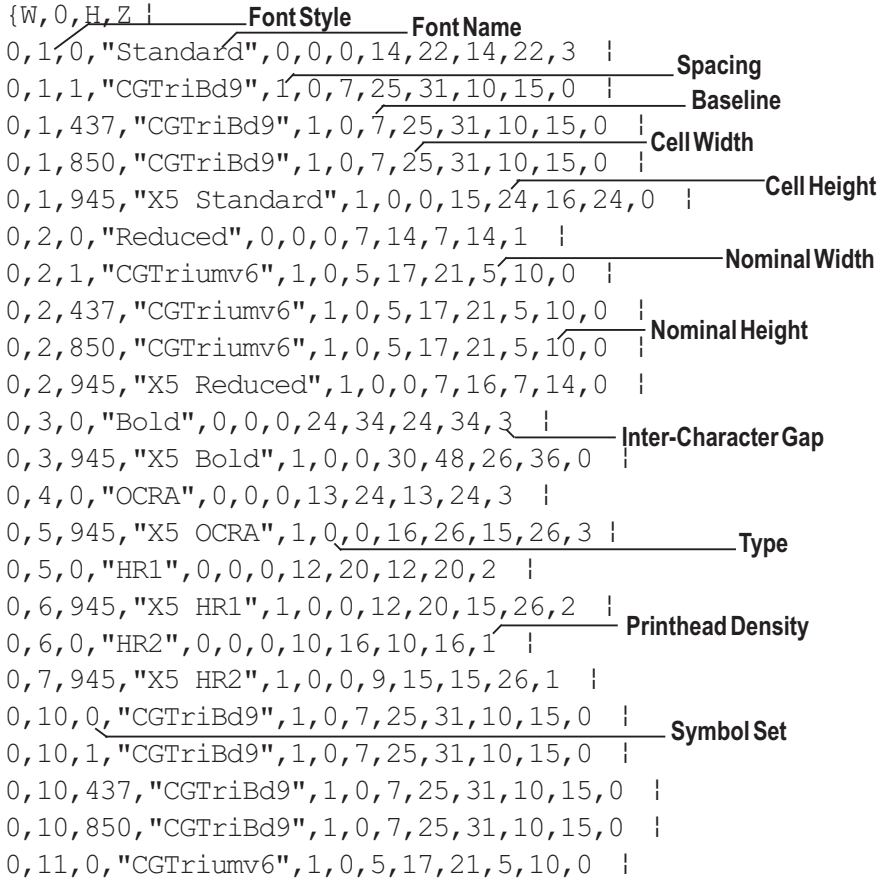
Selects all fonts and checks the memory usage in RAM. The printer returns the following to the host:

```
{W,0,M,R¦
Number of bytes free, Number of bytes used¦}
```

Example `{W,0,H,Z ¦ }`

Selects all fonts and uploads the font size information for any downloaded fonts.

The 9855 printer returns the following to the host:



```
0,11,1,"CGTriumv6",1,0,5,17,21,5,10,0 ¦
0,11,437,"CGTriumv6",1,0,5,17,21,5,10,0 ¦
0,11,850,"CGTriumv6",1,0,5,17,21,5,10,0 ¦
0,15,0,"CGTriumv7",1,0,7,21,28,9,14,0 ¦
0,15,1,"CGTriumv7",1,0,7,21,28,9,14,0 ¦
0,15,437,"CGTriumv7",1,0,7,22,28,9,14,0 ¦
0,15,850,"CGTriumv7",1,0,7,22,28,9,14,0 ¦
0,16,0,"CGTriumv9",1,0,8,28,35,12,18,0 ¦
0,16,1,"CGTriumv9",1,0,8,28,35,12,18,0 ¦
0,16,437,"CGTriumv9",1,0,8,29,35,12,18,0 ¦
0,16,850,"CGTriumv9",1,0,8,29,35,12,18,0 ¦
0,17,0,"CGTriumv11",1,0,9,31,40,13,22,0 ¦
0,17,1,"CGTriumv11",1,0,9,31,40,13,22,0 ¦
0,17,437,"CGTriumv11",1,0,9,33,40,13,22,0 ¦
0,17,850,"CGTriumv11",1,0,9,33,40,13,22,0 ¦
0,18,0,"CGTriumv15",1,0,13,47,59,20,31,0 ¦
0,18,1,"CGTriumv15",1,0,13,47,59,20,31,0 ¦
0,18,437,"CGTriumv15",1,0,13,49,59,20,31,0 ¦
0,18,850,"CGTriumv15",1,0,13,49,59,20,31,0 ¦
0,510,0,"CGTriumv7",1,0,7,21,28,9,14,0 ¦
0,510,1,"CGTriumv7",1,0,7,21,28,9,14,0 ¦
0,510,437,"CGTriumv7",1,0,7,22,28,9,14,0 ¦
0,510,850,"CGTriumv7",1,0,7,22,28,9,14,0 ¦
0,511,0,"CGTriumv9",1,0,8,28,35,12,18,0 ¦
0,511,1,"CGTriumv9",1,0,8,28,35,12,18,0 ¦
0,511,437,"CGTriumv9",1,0,8,29,35,12,18,0 ¦
0,511,850,"CGTriumv9",1,0,8,29,35,12,18,0 ¦
0,512,0,"CGTriumv11",1,0,9,31,40,13,22,0 ¦
0,512,1,"CGTriumv11",1,0,9,31,40,13,22,0 ¦
0,512,437,"CGTriumv11",1,0,9,33,40,13,22,0 ¦
0,512,850,"CGTriumv11",1,0,9,33,40,13,22,0 ¦
0,513,0,"CGTriumv15",1,0,13,47,59,20,31,0 ¦
0,513,1,"CGTriumv15",1,0,13,47,59,20,31,0 ¦
0,513,437,"CGTriumv15",1,0,13,49,59,20,31,0 ¦
0,513,850,"CGTriumv15",1,0,13,49,59,20,31,0 ¦
0,70,0,"Paxar15",1,0,7,32,42,22,42,0 ¦
0,71,0,"Paxar18",1,0,9,34,51,27,51,0 ¦
```

```
0,72,0,"Nafta15",1,0,6,32,42,32,41,0  ¦
0,73,0,"Nafta18",1,0,8,48,51,46,50,0  ¦
0,21,0,"ZIAFont",0,0,0,5,9,5,9,1  ¦
0,22,0,"ZIBFont",0,0,0,7,11,7,11,2  ¦
0,23,0,"ZICFont",0,0,0,10,18,10,18,2  ¦
0,24,0,"ZIDFont",0,0,0,10,18,10,18,2  ¦
0,25,0,"ZIEFont",0,0,0,15,28,15,28,5  ¦
0,26,0,"ZIFFont",0,0,0,13,26,13,26,3  ¦
0,27,0,"ZIGFont",0,0,0,40,60,40,60,8  ¦
0,50,0,"EffSwissBold",1,1,92248  ¦
0,56,0,"PaxSymbols",1,1,12260  ¦ }
```

* The CG Triumvirate typefaces are trademarks of Monotype Imaging, Inc.
Fonts 21-27 are only for the 9855 MLI printer.

Note: Fonts 510, 511, 512, and 513 are the same as fonts 15, 16, 17, and 18.

Spacing	Monospaced (0) or proportional (1).
Type	Bitmapped (0) or scalable (1).
Baseline	Bottom of the font.
Cell Width	Horizontal number of dots to contain the widest character.
Cell Height	Vertical number of dots to contain the tallest character.
Nominal Width	Average width for lower-case letters.
Nominal Height	Average height for lower-case letters.
Inter-Character Gap	Default spacing between characters in monospaced fonts.
Printhead Density	Displays whether a 203 (0) dpi or 300 (1) dpi printhead is used. The scalable font (font 50) does not display which printhead (203 dpi or 300 dpi) is used.

Uploading Format Header Information

You can upload format header information from the formats in memory to check the supply length and width for each format. Formats stored in Flash memory are loaded into RAM when the 9855 or 9860 printer boots. However, the formats remain in Flash memory when you turn off the printer.

Syntax `{header,format#,action,device¦}`

F1. header Format Header

F2. format# Format number from **0** to **999**. 0 is for all formats in memory.

F3. action Action. Options:

- **A** Adds the specified format
- **C** Clears the specified format
- **H** Uploads format header information

F4. device Device. Options:

- **F** Flash
- **R** Volatile RAM
- **Z** All devices (use for upload)

Example `{F,0,H,Z ¦}`

Selects all formats in memory and returns the following:

Example

```
{F,0,H,Z ¦
Fmt_1,406,406 ¦
Fmt_10,324,406 ¦
Fmt_15,812,812 ¦
Fmt_20,305,609 ¦
Fmt_25,1218,406 ¦}
```

Displays the format number, supply length and supply width (in dots) for each format in memory.

Example `{F,1,H,Z ¦}`

Selects format1 and returns the following to the host:

```
{F,1,H,Z ¦
Fmt_1,406,406 ¦}
```

Displays the supply length and supply width (in dots) for format1.

Defining a Verifier Configuration Packet

With the verifier configuration packet you can customize the verifier for each format you print. You can select which bar codes to scan, the acceptable ANSI grade levels, quiet zone, X-dimension range, and more. You can download the Monarch® Verifier Configuration Tool (from our Web site) to create this packet or follow the syntax below.

Syntax

```
{V,format#,action,device,"name" ¦
D,"vfr_comds" ¦}
```

V1. V — Verifier Configuration Packet.

V2. format# — Number from **0** to **999** to identify the format number that corresponds to this particular verifier configuration packet. However, you can assign a verifier configuration packet to any format even if the format number is not changed. See "Defining Verifier Fields" in Chapter 3 for more information.

Note: You can specify up to 50 different verifier configurations for your formats.

V3. action — Action. Enter **A** to add a verifier configuration.

V4. device — Storage device. Options:

- **F** Flash. Stores the verifier configuration in the printer. Packets stored in flash memory are saved when the power is turned off.
- **T** Temporary. Passes the packet through the printer and stores the packet in the verifier. Packets stored in temporary memory are lost when the power is turned off.

V5. "name" — Packet name, **0** to **8** characters, enclose within quotation marks. The name you enter here is shown as a custom configuration on the menu for MODE. Refer to your verifier's *Operating Instructions* (available on our Web site) for more information.

D1. D — Non-Printable Text/Data Field.

D2. "vfr_comds" — Verifier commands. Must be enclosed within quotation marks. Refer to the *SV Series Operator's Guide* for the complete list of verifier commands.

Example

```
{V,1,A,T,"BEAMON" ¦
D,"~LV02"¦}
```

The verifier's configuration packet ID is "1" and named "BEAMON." The verifier packet is added to temporary memory. It uses Mode 2.

Defining a Network Console Packet

The network console packet is only valid on a 9855 or 9860 Version 2.0 (or greater) printer containing MonarchNet2 software for the Monarch® 7410 or Monarch® 7411 Ethernet Print Server. Use the network console packet to send console commands directly to the network card via the printer's serial port. If the network card does not appear to be communicating with the printer, you can use the network console packet to change the SSID, IP Address, etc. of the network card.

Syntax

```
{N,number,action,device,"name" ¦
C,"con_comds"¦}
```

N1. N Network Console Packet.

N2. number Number from **0** to **999** to identify the network console packet.

N3. action Action. Enter **A** to add a verifier configuration.

N4. device Storage device. Enter **T** to pass the packet through the printer and store the packet in the network card.

N5. "name" Packet name, **0** to **8** characters, enclose within quotation marks.

C1. C Command field.

C2. "con_comds" Console commands. Must be enclosed within quotation marks. Each command must be on a separate line. The maximum number of characters per command is 100. Refer to the list of console commands in the *MonarchNet2 Operating Instructions* for more information.

Note: The maximum number of commands per packet is twenty five (25).

Example

```
{N,1,A,T,"mystore" ¦
C,"set ip me static"  ¦
C,"init"  ¦
C,"exit"  ¦ }
```

Sends the network console packet 1 "my store" directly to the network card (**T**) and sets the IP method to static for determining the IP Addresses. The Init and Exit commands must be used to save changes and initialize the network card.

Defining the RFID Setup Packet for UHF

This packet is only valid on 9855 RFID printers. Use the RFID setup packet (X) to set the protocol, write attempts, read power, write power, and signal adjust.

Note: Refer to the *RFID Setup Guide and Supply Chart* for the read and write power settings and signal adjustment based on your RFID supplies.

Syntax

```
{I,X,protocol,write_attem,read_power,
write_power,signal_adjust¦}
```

X1. X RFID Setup Packet

X2. protocol Select the UHF protocol. The default is **0**. Options:

0 C1Gen2 (Class 1 Gen 2)
1 C1Gen1 96 (Class 1 Gen 1 96-bit)
2 C1Gen1 EPC64/96 (Class 1 Gen 1 EPC64/96)
3 EM4122

X3. write_attem The number of times the interrogator tries to program the RFID tag in the RF Field. The range is **1** – **5**. The default is **3**.

X4. read_power The amount of power to read an RFID tag. The range is **1** – **25**. For the Japanese frequency, the range is **1** – **10**. The default is **18**.

X5. write_power The amount of power to write (program) an RFID tag. The range is **1** – **25**. For the Japanese frequency, the range is **1** – **10**. The default is **18**.

X6. signal_adjust The strength of the RF Field emitted by the printer's antenna. The higher the value, the greater the power of the RF Field. The signal adjustment varies depending on the selected protocol. The range is **2** – **10**. The default is **2**.

Example

```
{I,X,0,3,10,10,6¦}
```

Uses the default protocol (Class 1 Gen 2), sets the number of write attempts to 3, sets the read and write power to 10 and the signal adjustment to 6.

Defining the RFID Setup Packet for HF

This packet is only valid on 9855 RFID printers. Use the RFID setup packet (X) to set the protocol, write attempts and attenuation.

Note: Refer to the *HF Setup Guide and Supply Chart* for the protocol and attenuation settings based on your RFID supplies.

Syntax `{I,X,protocol,write_attem,attenuation¦}`

X1. X RFID Setup Packet

X2. protocol Select the HF protocol. The default is **0**. Options:

0	AUTO-Select
1	TI ISO15693
2	NXP ISO15693
3	I-CODE UID

X3. write_attem The number of times the interrogator tries to program the RFID tag in the RF Field. The range is **1** – **4**. The default is **3**.

X4. attenuation The amount of power to read an RFID tag. The range is **1** – **4**. The default is **2**.

Example `{I,X,0,3,2¦}`

Uses the default protocol (AUTO-Select), sets the number of write attempts to 3 and the attenuation to 2.

DEFINING FIELDS

3

This chapter provides a reference for defining

- the format header
- text and constant text
- bar code fields
- line and box fields
- verifier fields
- RFID data fields.

Defining the Format Header

A Format Header begins a format file.

Syntax

```
{F,format#,action,device,measure,length,
width,"name" ¦
```

F1. F Format Header.

F2. format# Unique number from **1** to **999** to identify the format.

F3. action Action. Enter **A** to add the format to the printer.

F4. device Format storage device. Options:
F Flash (must be formatted first. See “Formatting Flash” and “Flash Memory Guidelines” in Chapter 2 for more information.)
R Volatile RAM

F5. measure Unit of measure. **E** (English - in 1/100 inches), **M** (Metric -in 1/10 mm), or **G** (Graphic - in dots). See the following table.

Printer	Unit of Measure	Supply Length	Supply Width
9825/ 9855/ 9860	English Metric 203 dpi Dots	75-1600 191-4064 152-3248	32-400 81-1016 62-812
9855/ 9860	English Metric 300 dpi Dots	75-1200 191-3048 225-3600	32-400 81-1016 96-1200
9855RFMP/ 9855HF	English Metric 203 dpi Dots 300 dpi Dots	75-1300 191-3302 152-2639 225-3900	75-400 191-1016 152-812 225-1200

F6. length Supply length in selected units. Measure supply from the leading edge of one label to the leading edge of the next label. Use the table above.

Note: You can create longer images if you reallocate memory to increase your image buffer. See "Defining the Memory Packet" in Chapter 2 for more information.

F7. width Width, from left to right, in selected units. Use the table above.

F8. “name” Format name (optional), **0** to **8** characters, enclose within quotation marks. The range is **1** to **256** characters for the 9855 XML-enabled printer.

Example `{F,1,A,R,E,300,200,"TEXTILES" ¦`

Adds Format 1 (“TEXTILES”) to the printer. It uses a three inch long by two inch wide label.

Defining Text Fields

Create a separate definition for each text field. If text falls on two lines, each line of text requires a separate definition.

Syntax

```
T,field#,# of char,fix/var,row,column,
gap,font,hgt mag,wid mag,color,alignment,
char rot,field rot,sym set ¦
```

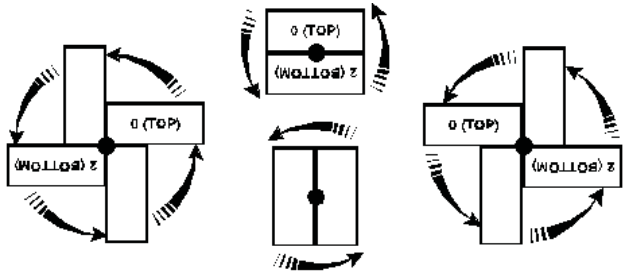
T1. T Text Field.

T2. field# Unique number from **1** to **999** to identify this field.

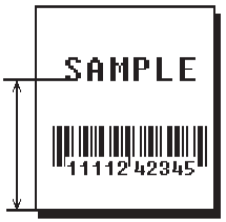
T3. # of char Maximum number of printed characters (**0** to **2710**) in the field.

T4. fix/var Fixed or variable length field. Options:
F Fixed length
V Variable length

T5. row For monospaced fonts, distance from bottom of print area to the pivot point. The pivot point varies depending on how text is justified.



For proportionally spaced fonts, distance from bottom of print area to baseline of characters in field.



Printer	Unit of Measure	Row or End Row	Column or End Column
9825/ 9855/ 9860	English Metric 203 dpi Dots	0-1599 0-4061 0-3246	0-399 0-1013 0-810
9855/ 9860	English Metric 300 dpi Dots	0-1199 0-3045 0-3597	0-399 0-1013 0-1197
9855RFMP/ 9855HF	English Metric 203 dpi Dots 300 dpi Dots	0-1299 0-3299 0-2637 0-3897	0-399 0-1013 0-810 0-1197

T6. column Distance from the left edge of the print area to the pivot point to find the column location. Use previous table for values.



T7. gap Number of dots between characters 203 dpi (or 300 dpi for 9855/9860 printers). Range: **0** to **99**.

Note: For monospaced fonts, the additional spacing is added to the existing inter-character gap. This is also true for proportionally spaced fonts, but remember that the inter-character gap varies with character combinations.

Any number other than **0** or the default number affects your field width. Default spacing:

Standard		**3 dots**
Reduced		**1 dot**
Bold		**3 dots**
OCRA-like		**3 dots**
CG Triumvirate Typeface Bold		**varies with each letter**
CG Triumvirate	Typeface	**varies with each letter**

T8. font Style of font. Options:

1	Standard	**10**	CG Triumvirate Typeface Bold
2	Reduced	**11**	CG Triumvirate Typeface
3	Bold	**15**	7 pt. CG Triumvirate Typeface
4	OCRA-like	**16**	9 pt. CG Triumvirate Typeface
5	HR1	**17**	11 pt. CG Triumvirate Typeface
6	HR2	**18**	15 pt. CG Triumvirate Typeface
		50	EFF Swiss Bold (TrueType® Scalable)
		56	PaxarSymbols (version 5.0 or greater)

Or a valid downloaded font selector number.
Fonts **5** and **6** are for numeric data only.
The CG Triumvirate typefaces support only the ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font does not support Code Page 1256 (Arabic). See Appendix C for more information.

T9. hgt mag Height magnifier, **1** to **7** times (**4** to **255** points for scalable/downloaded TrueType fonts). Use a magnifier of **1** with proportionally spaced fonts, because characters lose smoothness at higher magnifications. See Appendix B, “Fonts,” for more information about fonts.

T10. wid mag Width magnifier, **1** to **7** times (**4** to **255** points for scalable/downloaded TrueType fonts). Proportionally spaced fonts do not have a set width. To estimate the size of your field, use the letter “W” for the widest field or an “L” for an average width field. Find your selected font and the desired width in Appendix B, “Fonts.”

Note: To use large point sizes (greater than 60 point), you must reconfigure memory and increase the size of the scalable (vector) fonts buffer.

T11. color There are two types of field color overlay attributes:

Transparent	The overlay field (text or constant text) does not block out (or “erase”) existing fields.
Opaque	The overlay field blocks out (or “erases”) existing fields.

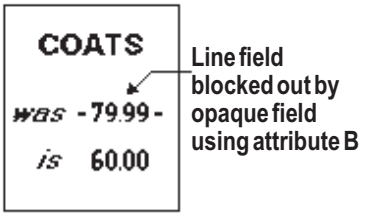
Options for standard printer fonts:

B	Opaque, Normal, Black, Normal
D/R/W	Opaque, Normal, White, Normal
O	Transparent, Normal, Black, Normal

Options for scalable fonts:

A/N	Opaque, Normal, Black, Bold
B/O	Opaque, Normal, Black, Normal
E/S	Opaque, Italics, Black, Bold
F/T	Opaque, Italics, Black, Normal

Note: Solid black print should not exceed 30% on a given square inch of the label, or the printhead life may be decreased.



Field placement in the packet is an important consideration when using field color attributes. If a line field is defined before the overlay (text or constant text) field, the line field is blocked out by the overlay field, depending on the overlay field's color attribute. If a line field is defined after the overlay field, the line field is not blocked out by the overlay field, regardless of the overlay field's color attribute.

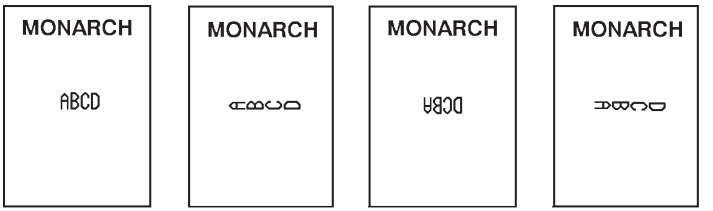
T12. alignment Options:

- **L** Align on left side of field.
- **C** Center text within field (monospaced fonts only)
- **R** Align on right side of field (monospaced fonts only)
- **B** Align at midpoint of field
- **E** Align at endpoint of the field

Use **L**, **B**, or **E** for any font.

T13. char rot Character rotation. The field or supply does not rotate, only the characters do. Options:

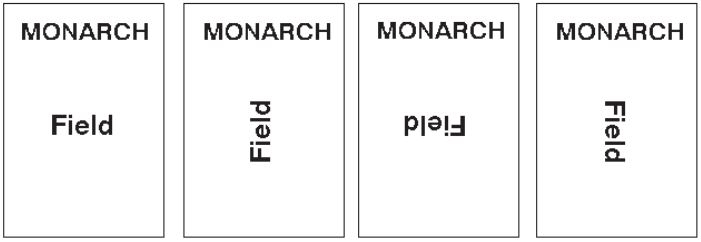
- **0** Top of character points to top of field
- **1** Top of character points to left of field
- **2** Top of character points to bottom of field
- **3** Top of character points to right of field



T14. field rot

Field rotation. Field rotation rotates the whole field, not just the characters. Rotation is affected by the pivot point, which varies depending on how text is justified. Lower left corner of field is the pivot point. Options:

0 Top of field points to top of supply
1 Top of field points to left of supply
2 Top of field points to bottom of supply
3 Top of field points to right of supply



T15. sym set

Symbol set. Use **0** for the Internal Symbol Set. For scalable or TrueType fonts, use:

1 ANSI Symbol Set
100 Macintosh
101 Wingdings
102 Unicode (user input) for particular mapping
103 BIG5 (user input) for Unicode mapping
104 GB2312 (user input) for Unicode mapping
105 SJIS (user input) for Unicode mapping
Code Page 932 (Japanese Shift-JIS)
106 GB2312 (user input) for GB2312 mapping
Code Page 936 (Simplified Chinese)
107 BIG5 (user input) for BIG5 mapping
Code Page 950 (Traditional Chinese)
110 Unicode UTF-8
437 DOS Code Page 437 (Domestic)
850 DOS Code Page 850 (International)
852 DOS Code Page 852 (Latin 2)
855 DOS Code Page 855 (Russian)
857 DOS Code Page 857 (IBM Turkish)
860 DOS Code Page 860 (MS-DOS Portuguese)
1250 Code Page 1250 (Latin 2)
1251 Code Page 1251 (Cyrillic)
1252 Code Page 1252 (Latin 1)
1253 Code Page 1253 (Greek)
1254 Code Page 1254 (Turkish)
1255 Code Page 1255 (Hebrew)
1256 Code Page 1256 (Arabic)
1257 Code Page 1257 (Baltic)
1258 Code Page 1258 (Vietnam)

Note: The Standard, Reduced, Bold, OCRA and HR fonts only support the Internal Symbol Set (0). The CG Triumvirate™ typefaces only support the ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font (font#50) does not support Code Page 1256 (Arabic). Code pages 852-860 and 1250-1258 are for downloaded TrueType fonts or the scalable font. Code pages 102-110 require the memory expansion option and a downloaded International TrueType font. TrueType fonts are designed to be regionally specific; therefore, all code pages may not be supported in a given font. See Appendix C, “Symbol Sets/ Code Pages” for more information.
If using symbol set 110 (Unicode UTF-8), set the MPCL control characters (start of header, etc.) to decimal values between **0** and **128**; otherwise, errors may occur with the Unicode data entered. See Chapter 2, "Configuring the Printer" for more information about the MPCL control characters.

Example

```
T,2,10,V,250,80,0,1,1,1,B,C,0,0,0 ¦
```

Defines a text field (field #2) with a variable length of up to 10 characters. The field begins at row 250, column 80. There is no additional gap between characters, and the Standard font is used without any additional magnification. The printing is black on white and centered. No field or character rotation is used. The internal symbol set is used.

Defining Bar Code Fields

Each bar code field requires a separate definition.

Syntax

```
B,field#,# of char,fix/var,row,column,
font,density,height,text,alignment,field rot,
type,sep_height,segment ¦
```

B1. B Bar Code Field.

B2. field# Unique number from **1** to **999** to identify this field.

B3. # of char Maximum number of characters. If the bar code uses a check digit, allow an extra character for the check digit. The actual maximum number of characters is limited by the size of the label and bar code density. Range: **0** to **2710**.

For the GS1 DataBar bar code, the maximum number of characters varies based on the specific GS1 DataBar type.

Bar Code Type (B13)	Maximum Number of Characters
1 - GS1 DataBar 14	13 - no check digit input
2 - GS1 DataBar 14 Truncated	13 - no check digit input
3 - GS1 DataBar 14 Stacked	13 - no check digit input
4 - GS1 DataBar 14 Stacked Omni directional	13 - no check digit input
5 - GS1 DataBar Limited	13 - no check digit input
6 - GS1 DataBar Expanded	*
7 - UPCA	11 - no check digit input
8 - UPCE	10 - no check digit input
9 - EAN13	12 - no check digit input
10 - EAN8	7 - no check digit input
11 - UCC/EAN128 and CC A/B	*
12 - UCC/EAN128 and CC C	*

* For more information, refer to the *GS1 General Specification*.

Note: If not enough characters are entered, the bar code pads to the left with zeros. If too many characters are entered, unpredictable results may occur.
If FNC1 (function 1) is supported, use ~029 in the batch data to invoke it.

Quick Response (QR Code) can use **299** to **2710** characters. DataMatrix can use up to **2710** numeric characters or **2335** alphanumeric characters. See Appendix A, "Samples" for more information.

Data Type	Model 1	Model 2
Numeric Data	1167	2710
Alphanumeric data	707	2710
8-byte data	486	2710
Kanji data	299	1817

Note: The maximum number of characters depends on the selected level of error correction. As you increase the error correction level, the maximum number of characters decreases.

B4. fix/var Fixed (**F**) or variable (**V**) length field.

Bar Code	Number of Characters	Fixed or Variable
UPCA	12	F
UPCA+2	14	F
UPCA+5	17	F
UPCA+Price CD	12	F
UPCE	7	F
UPCE+2	9	F
UPCE+5	12	F
EAN8	8	F
EAN8+2	10	F
EAN8+5	13	F
EAN13	13	F
EAN13+2	15	F
EAN13+5	18	F
EAN13+Price CD	13	F
POSTNET	9 or 11	F
Interleaved 2 of 5 or Interleaved I 2 of 5 with Barrier Bar	0 - 2710	F or V
Code 39 (w/ or w/o CD) or MOD43	0 - 2710	F or V
Codabar (NW7)	0 - 2710	F or V
Code 128	0 - 2710	F or V
Code 16K	0 - 2710	V
Code 93	0 - 2710	V
MSI	0 - 14	F or V
PDF 417	0 - 2710	F or V
Maxicode*	0 to 93 (alphanumeric) 0 to 128 (numeric)	F or V
Data Matrix*	0 to 2335 (alphanumeric) 0 to 2710 (numeric)	V
Quick Response*	1167 - 2710 (numeric) 707 - 2710 (alphanumeric)	V

* For more information about MaxiCode, Data Matrix, and Quick Response, see Appendix A, “Samples.”

Bar Code	Number of Characters	Fixed or Variable
Aztec	0 - 2710	F or V
GS1 DataBar	0 - 2710	F or V

B5. row

Distance from bottom of the print area to the pivot point of the field. The pivot point varies, depending on how the field is justified. Pivot points:



Left/Center/Right-Justified Fields

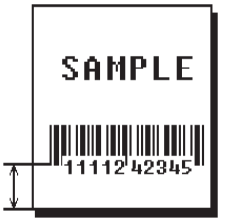


Balanced Fields



End-Justified Fields

Remember to include text or numbers that may appear with the bar code for the row measurement.



Printer	Unit of Measure	Row or End Row	Column or End Column
9825/ 9855/ 9860	English Metric 203 dpi Dots	0-1599 0-4061 0-3246	0-399 0-1013 0-810
9855/ 9860	English Metric 300 dpi Dots	0-1199 0-3045 0-3597	0-399 0-1013 0-1197
9855RFMP/ 9855HF	English Metric 203 dpi Dots 300 dpi Dots	0-1299 0-3299 0-2637 0-3897	0-399 0-1013 0-810 0-1197

B6. column

Distance from the lower left edge of the print area to the pivot point. Use the previous table for values.

Allow a minimum of **1/10** inch between the scan edge of bar code and label edges or other data.
If using the optional verifier, allow a minimum of 1.3 inches (33 mm) between the bar code and the top of the label. See “Determining the Print Area” in Chapter 1 for more information.



B7. font

Bar code. Options:

1	UPCA
2	UPCE
3	Interleaved 2 of 5
4	Code 39 (no check digit)
5	Codabar
6	EAN8
7	EAN13
8	Code 128
9	MSI
10	UPCA +2
11	UPCA +5
12	UPCE +2
13	UPCE +5
14	EAN8 +2
15	EAN8 +5
16	EAN13 +2
17	EAN13 +5
22	POSTNET
23	Code 93
31	Code 16K
32	PDF417
33	MaxiCode
35	Data Matrix (ECC-200)
36	Quick Response
37	Aztec
38	GS1 DataBar
40	Code 39 (MOD 43 check digit)
41	UPCA & Price CD
44	EAN13 & Price CD
50	Interleaved 2 of 5 with Barrier Bar

B8. density

Bar code density. Use the following table for other bar codes.

203 DPI Bar Code Densities

Bar Code Type	Density Selector	Density (% or cpi)	Narrow Element (dots/mils)	Narrow to Wide Ratio	Data Length	Appearance Codes Available	Char Set
UPCA +2/+5 Price CD	**2** 4	76% 114%	2/9.9 3/14.8	N/A	11 or 12 14/17	1, 5, 6, **7** or 8	0 to 9
UPCE +2/+5	**2** 4	76% 114%	2/9.9 3/14.8	N/A	6 or 7 9/12	1, 5, 6, **7** or 8	0 to 9
EAN8 +2/+5	**2** 4	76% 114%	2/9.9 3/14.8	N/A	7 or 8 10/13	1, 5, 6,**7** or 8	0 to 9
EAN13+2/+5 Price CD	**2** 4	76% 114%	2/9.9 3/14.8	N/A	12 or 13 15/18	1, 5, 6,**7** or 8	0 to 9
Interleaved 2 of 5 or I2of5 with Barrier Bar	1 2 3 4 5 6 7 8 9 10 11 **12** 13	1.1 2.1 3.2 4.2 5.6 6.3 7.5 8.8 9.6 11.2 11.0 12.7 14.5	21/103.4 12/59.1 7/34.5 6/29.6 4/19.7 4/19.7 3/14.8 3/14.8 3/14.8 2/9.9 2/9.9 2/9.9 2/9.9	1:3.0 1:2.5 1:3.0 1:2.5 1:3.0 1:2.5 1:3.0 1:2.3 1:2.0 1:3.0 1:3.0 1:2.5 1:2.0	0 to 2710	8	0 to 9
(Code 39 or MOD43 (Extended Code 39)	1 2 3 4 6 **7** 11 12 20	1.4 1.7 3.5 4.2 6.3 7.0 3.9 12.7 3.0	10/49.3 8/39.4 4/19.7 3/14.8 2/9.9 2/9.9 4/19.7 1/4.9 5/24.6	1:2.5 1:2.5 1:2.5 1:3.0 1:3.0 1:2.5 1:2.0 1:3.0 1:2.2	0 to 2710	8	SPACE $%*+-./ 0 to 9 A to Z
Codabar (NW7)	2 3 4 5 7 **8** 9	2.1 3.0 4.6 5.1 8.4 9.2 10.1	8/39.4 6/29.6 4/19.7 4/19.7 2/9.9 2/9.9 2/9.9	1:3.0 1:2.5 1:2.5 1:2.0 1:3.0 1:2.5 1:2.0	0 to 26	8	$+-./ 0 to 9 a to d
Code 128 or Code 16K	4 6 **8** 20	3.5/7.0 4.4/8.7 5.8/11.7 8.7/11.5	5/24.6 4/19.7 3/14.8 2/9.9	N/A	0 to 2710	8	00H to 7FH

Note: The start (*) and stop (+) characters are automatically added for Code 39. Code 39, density 12, produces a one-dot narrow bar. This density is intended for special U.S.P.S. ACT-tag applications only. Synthetic supplies are recommended to produce scannable bar codes.

Bar Code Type	Density Selector	Density (% or cpi)	Narrow Element (dots/mils)	Narrow to Wide Ratio	Data Length	Appearance Codes Available	Char Set
CODE 93	3 4 5 **7** 10	3.7 4.5 5.6 7.5 11.2	6/29.6 5/24.6 4/19.7 3/14.8 2/9.9	N/A	0 to 2710	8	00H to 7FH
MSI	4 5 **7**	4.2 5.6 7.2	4/19.7 3/14.8 2/9.9	1:2.0 1:2.0 1:2.5	0 to 14	8	0 to 9
POSTNET	0 (fixed at 4.3 cpi)	24/118.2	10/49.3	4/19.7 (5 dot gap)	0,5,6,9 or 11	8	0 to 9
MaxiCode	**7**	N/A	N/A	N/A	99	8	00H to FFH

Bar Code Type	Density Selector	Element Width (dot/mils)	Row Height (dots/mils)	Aspect Ratio	Data Length	Appearance Codes Available	Char Set
PDF417	1 2 3 4 5 6 7 8 9	2/9.8 2/9.8 2/9.8 3/14.8 3/14.8 3/14.8 4/19.7 4/19.7 4/19.7	2/9.8 4/19.7 6/29.6 3/14.8 6/29.6 9/44.3 4/19.7 8/39.4 12/59.1	1:1 1:2 1:3 1:1 1:2 1:3 1:1 1:2 1:3	0 to 2709	8	00H to FFH

Bar Code Type	Density Selector	Data Length
Quick Response (QR Code) Models 1 and 2	**0**	Model 1: 0 - 1167 Numeric;0 - 707 Alphanumeric; 0 - 486 (8-bit); 0 - 299 (Kanji) Model 2: 0 - 2710 Numeric, Alphanumeric and 8-bit; 0 - 1817 Kanji

Note: Values in bold indicate the default.

203 DPI Bar Code Densities

Bar Code	Size Row x Col.	Density Selector	Max. Data Length Num. X Alphanum.	App Code	Char Set
Data Matrix Square symbols	10 x 10	1	6 x 3	8	00H to FFH
	12 x 12	2	10 x 6		
	14 x 14	3	16 x 10		
	16 x 16	4	24 x 16		
	18 x 18	5	36 x 25		
	20 x 20	6	44 x 31		
	22 x 22	7	60 x 43		
	24 x 24	8	72 x 52		
	26 x 26	9	88 x 64		
	32 x 32	10	124 x 91		
	36 x 36	11	172 x 127		
	40 x 40	12	228 x 169		
	44 x 44	13	288 x 214		
	48 x 48	14	348 x 259		
	52 x 52	15	408 x 304		
	64 x 64	16	560 x 418		
	72 x 72	17	736 x 550		
	80 x 80	18	912 x 682		
	88 x 88	19	1152 x 862		
	96 x 96	20	1392 x 1042		
	104 x 104	21	1632 x 1222		
	120 x 120	22	2100 x 1573		
	132 x 132	23	2608 x 1954		
	144 x 144	24	2710 x 2335		
		0 default (bar code size automatically determined by data)			

Bar Code	Size Row x Col.	Density Selector	Max. Data Length Num. X Alphanum.	App Code	Char Set
Data Matrix Rectangular symbols	8 x 18	25	10 x 6	8	00H to FFH
	8 x 32	26	20 x 13		
	12 x 26	27	32 x 22		
	12 x 36	28	44 x 31		
	16 x 36	29	64 x 46		
	16 x 48	30	98 x 72		
		0 default (bar code size automatically determined by data)			

Note: The printers support printing a Data Matrix symbol with an X-dimension of 13 mils or greater (3 dots @203 dpi). If you use a denser bar code, make sure the bar code scans in your particular application. Our “premium” supplies and increasing the print contrast are recommended for denser bar codes. Depending on your application, additional densities are available.

203 DPI Bar Code Densities

Bar Code Type	Density Selector	Narrow Element (dots/mils)	Data Length	Chart Set
GS1 DataBar	**2** 3 4 5 6 7 8	2/9.9 3/14.8 4/19.7 5/24.6 6/29.6 7/34.5 8/39.4	0 to 2710	00H to FFH
Aztec	**2** 3 4 5 6 7 8 9 10 11 12 13 14 15	0.0099 0.0148 0.0197 0.0247 0.0296 0.0345 0.0394 0.0444 0.0493 0.0542 0.0592 0.0641 0.069 0.074	0 to 2710	00H to FFH

Note: Values in bold indicate the default.

300 DPI Bar Code Densities

Bar Code Type	Density Selector	Density (% or cpi)	Narrow Element (dots/mils)	Narrow to Wide Ratio	Data Length	Appearance Codes Available	Char Set
UPCA +2/+5 Price CD	**2** 4	77% 103%	3/10 4/13.3	N/A	11 or 12 14/17	1, 5, 6, **7** or 8	0 to 9
UPCE +2/+5	**2** 4	77% 103%	3/10 4/13.3	N/A	6 or 7 9/12	1, 5, 6, **7** or 8	0 to 9
EAN8 +2/+5	**2** 4	77% 103%	3/10 4/13.3	N/A	7 or 8 10/13	1, 5, 6,**7** or 8	0 to 9
EAN13+2/+5 Price CD	**2** 4	77% 103%%	3/10 4/13.3	N/A	12 or 13 15/18	1, 5, 6,**7** or 8	0 to 9
Interleaved 2 of 5 or I2of5 with Barrier Bar	1 2 3 4 5 6 7 8 9 10 11 **12** 13	1.1 2.1 3.3 4.2 5.6 6.2 8.3 9.4 9.9 11.1 11.1 13.0 14.3	31/103.4 18/60.1 10/33.4 9/30.0 6/20.0 6/20.0 4/13.3 4/13.3 4/13.3 3/10 3/10 3/10 3/10	1:3.0 1:2.5 1:3.0 1:2.4 1:3.0 1:2.5 1:3.0 1:2.5 1:2.3 1:3.0 1:3.0 1:2.3 1:2.0	0 to 2710	8	0 to 9
(Code 39 or MOD43 (Extended Code 39)	1 2 3 4 6 **7** 11 12 20	1.4 1.7 3.4 4.7 6.2 7.1 3.8 11.5 3.1	15/50.0 12/40.0 6/20.0 4/13.3 3/10.0 3/10.0 6/20.0 2/6.7 7/23.4	1:2.5 1:2.5 1:2.5 1:3.0 1:3.0 1:2.5 1:2.0 1:3.0 1:2.2	0 to 2710	8	SPACE $%*+-./ 0 to 9 A to Z
Codabar (NW7)	2 3 4 5 7 **8** 9	2.3 3.4 5.0 5.6 9.1 10.4 11.1	12/40.0 9/30.0 6/20.0 6/20.0 3/10.0 3/10.0 3/10.0	1:3.0 1:2.5 1:2.5 1:2.0 1:3.0 1:2.5 1:2.0	0 to 26	8	$+-./ 0 to 9 a to d
Code 128 or Code 16K	4 6 **8** 20	4.5 6.8 9.1 3.9	6/20.0 4/13.3 3/10.0 7/23.4	N/A	0 to 2710	8	00H to 7FH

Note: The start (*) and stop (+) characters are automatically added for Code 39. Code 39, density 12, produces a one-dot narrow bar. This density is intended for special U.S.P.S. ACT-tag applications only. Synthetic supplies are recommended to produce scannable bar codes.

Bar Code Type	Density Selector	Density (% or cpi)	Narrow Element (dots/mils)	Narrow to Wide Ratio	Data Length	Appearance Codes Available	Char Set
CODE 93	3 4 5 **7** 10	3.7 4.8 5.6 8.3 11.1	9/30.0 7/23.4 6/20.0 4/13.3 3/10.0	N/A	0 to 2710	8	00H to 7FH
MSI	4 5 **7**	4.2 6.2 7.5	6/20.0 4/13.3 3/10.0	1:2.0 1:2.0 1:2.3	0 to 2710	8	0 to 9
POSTNET	0 (fixed at 4.3 cpi)	24/118.2	10/49.3	6/20.0 (5 dot gap)	0,5,6,9 or 11	8	0 to 9
MaxiCode	**7**	N/A	N/A	N/A	99	8	00H to FFH

Bar Code Type	Density Selector	Element Width (dot/mils)	Row Height (dots/mils)	Aspect Ratio	Data Length	Appearance Codes Available	Char Set
PDF417	1 2 3 4 5 6 7 8 9	3/10.0 3/10.0 3/10.0 4/13.33 4/13.3 4/13.3 6/20.0 6/20.0 6/20.0	3/10.0 6/20.0 9/30.0 4/13.3 9/30.0 12/40.0 6/20.0 12/40.0 18/60.0	1:1 1:2 1:3 1:1 1:2 1:3 1:1 1:2 1:3	0 to 2709	8	00H to FFH

Bar Code Type	Density Selector	Data Length
Quick Response (QR Code) Models 1 and 2	**0**	Model 1: 0-1167 Numeric; 0-707 Alphanumeric; 0-486 (8-Bit); 0-299 Kanji Model 2: 0-2710 Numeric; Alphanumeric and 8-Bit; 0-1817 Kanji

Note: Values in bold indicate the default.

300 DPI Bar Code Densities

Bar Code	Size Row x Col.	Density Selector	Max. Data Length Num. X Alphanum.	App Code	Char Set
Data Matrix Square symbols	10 x 10	1	6 x 3	8	00H to FFH
	12 x 12	2	10 x 6		
	14 x 14	3	16 x 10		
	16 x 16	4	24 x 16		
	18 x 18	5	36 x 25		
	20 x 20	6	44 x 31		
	22 x 22	7	60 x 43		
	24 x 24	8	72 x 52		
	26 x 26	9	88 x 64		
	32 x 32	10	124 x 91		
	36 x 36	11	172 x 127		
	40 x 40	12	228 x 169		
	44 x 44	13	288 x 214		
	48 x 48	14	348 x 259		
	52 x 52	15	408 x 304		
	64 x 64	16	560 x 418		
	72 x 72	17	736 x 550		
	80 x 80	18	912 x 682		
	88 x 88	19	1152 x 862		
	96 x 96	20	1392 x 1042		
	104 x 104	21	1632 x 1222		
	120 x 120	22	2100 x 1573		
	132 x 132	23	2608 x 1954		
	144 x 144	24	2710 x 2335		
		0 default (bar code size automatically determined by data)			

Bar Code	Size Row x Col.	Density Selector	Max. Data Length Num. X Alphanum.	App Code	Char Set
Data Matrix Rectangular symbols	8 x 18	25	10 x 6	8	00H to FFH
	8 x 32	26	20 x 13		
	12 x 26	27	32 x 22		
	12 x 36	28	44 x 31		
	16 x 36	29	64 x 46		
	16 x 48	30	98 x 72		
		0 default (bar code size automatically determined by data)			

Note: The printers support printing a Data Matrix symbol with an X-dimension of 13 mils or greater (3 dots @203 dpi). If you use a denser bar code, make sure the bar code scans in your particular application. Our “premium” supplies and increasing the print contrast are recommended for denser bar codes. Depending on your application, additional densities are available.

300 DPI Bar Code Densities

Bar Code Type	Density Selector	Narrow Element (dots/mils)	Data Length	Chart Set
GS1 DataBar	**2** 3 4 5 6 7 8	3/9.8 4/13.1 5/16.4 7/23 8/26.2 10/32.8 11/36.1	0 to 2710	00H to FFH
Aztec	**2** 3 4 5 6 7 8 9 10 11 12 13 14 15	0.010 0.0133 0.0167 0.0233 0.0266 0.0333 0.0366 0.0433 0.0466 0.0533 0.0566 0.0633 0.0666 0.0733	0 to 2710	00H to FFH

Note: Values in bold indicate the default.

B9. height

Bar code height, in 1/100 inches, 1/10 mm, or dots. Minimum values:

English **19**
Metric **48**
203 Dots **38**
300 Dots **57**

POSTNET, PDF417, and MaxiCode bar codes have a fixed height. Always use **0** for these bar codes.
For Data Matrix and QR Code, the printer determines the size of the symbol, but the user's scanner determines the functional size (minimum height) of the symbol. Small Data Matrix and QR Codes may not be scannable. The Data Matrix and QR Code's height depends on the number entered for this parameter. For example, if you select 80, the symbol could be smaller than 0.80," but it will not be greater than the amount specified in this parameter. The symbol arranges the data according to rows and columns within the specified height.
For the GS1 DataBar bar code, the height is for the linear bar code only used with UCC/EAN family *types* listed in *B13*.
For the Aztec bar code, use **0**.

B10. text Appearance of text with bar code. For UPC and EAN only use **0** to **7**. For all others, use **8**, except where noted. Options:

- **0** Default
  MaxiCode Mode 0 (obsolete)
  QR Code Model 2
- **1** No check digit or number system
  QR Code Model 1
- **2** MaxiCode Mode 2 (Numeric Postal Code)
  QR Code Model 2
- **3** MaxiCode Mode 3 (Alphanumeric Postal Code)
- **5** Number system at bottom, no check digit
- **6** Check digit at bottom, no number system
- **7** Check digit and number system at bottom
- **8** No text, bar code only
  MaxiCode (autodetect modes 0, 2, or 3), Data Matrix, GS1 DataBar, and Aztec.

B11. alignment Choose **L**, **R**, **C**, **B** or **E** to align the bar code data correctly in the field. **B** centers variable width bar codes, which may not allow pad-character centering (Code 128, Code 39, etc.) **E** right justifies variable width bar codes. MaxiCode, Data Matrix, QR Code, GS1 DataBar, and Aztec must use **L**.

B12. field rot Field rotation. Field rotation rotates the whole field, not just the characters. Rotation is affected by the pivot point, which varies depending on how text is justified. Lower left corner of field is the pivot point. Options:

- **0** Top of field points to top of supply
  (Use for Maxicode)
- **1** Top of field points to left of supply
- **2** Top of field points to bottom of supply
- **3** Top of field points to right of supply

Note: Serial bar codes with an 8-dot narrow element do not automatically print at 2.5 IPS. Serial bar codes printed at speeds greater than 2.5 IPS may not scan properly.

B13. type Select from the bar code family. This parameter only applies to the GS1 DataBar bar code. For other bar codes, do not include this parameter. Options:

- **1** GS1 DataBar 14 (default)
- **2** GS1 DataBar 14 Truncated
- **3** GS1 DataBar 14 Stacked
- **4** GS1 DataBar 14 Stacked Omni directional
- **5** GS1 DataBar Limited
- **6** GS1 DataBar Expanded
- **7** UPCA
- **8** UPCE
- **9** EAN13
- **10** EAN8
- **11** UCC/EAN128 and CC A/B
- **12** UCC/EAN128 and CC C

B14. sep_height Height of the separator between the linear bar code and 2D bar code. This parameter only applies to the GS1 DataBar bar code. For other bar codes, do not include this parameter. The value is **1** or **2**. The default is 1.

B15. segment Width of the segment – only for use with GS1 DataBar family *types* listed in *B13*. For other bar codes, do not include this parameter. The range is even numbers from **2** to **22**. The default is 22.

Example `B,3,12,V,50,40,1,2,80,7,L,0 ¦`

Defines a bar code field (field #3) with 12 characters of variable length starting at row 150, column 40. A UPCA bar code with a density of 2 and a height of 80 is used. The check digit and number system are shown at the bottom. The bar code is left aligned without any field rotation.

Example `B,1,30,V,5,5,38,4,0,0,L,0,1,2,22¦`

Defines a bar code field (field #3) with up to 30 characters of variable length starting at row 5, column 5. The GS1 DataBar uses a density of 4. No text is shown with the bar code. The bar code is left-aligned with no field rotation.

Defining Non-Printable Text Fields

Non-printable text fields allow you to enter data without printing it in its entered form. Typically, non-printable fields “hold” data that later combines with other fields to form a merged field. Define non-printable text fields before you define the field where the information prints.

When you copy this field into another field, the maximum number of characters for the final field is **2710**. Allow only as many characters as you need, because extra characters use up space. Also, if you are copying into a bar code field, the maximum number of characters in the destination bar code is determined by the bar code specification (UPCA-12, EAN-13, etc.). You need to apply field options to manipulate the text entered in this field. For example, you may want to copy data from this field into another field. See “Option 4 Copy Data” in Chapter 4 for more information.

In the following example, data is entered into four non-printable fields and merged to form field 5, and is then printed as a bar code. See “Merging Fields” in Chapter 4 for more information.

Field	Data	Field Type
1	20374	Non-printable
2	339	Non-printable
3	8	Non-printable
4	15	Non-printable
5	20374339815	Bar Code

Each non-printable text field requires a separate definition.

Syntax `D,field#,# of char ¦`

D1. D Non-Printable Text Field.

D2. field# Unique number from **0** to **999** assigned to this field.

D3. # of char Maximum number of characters in this field: **0** to **2710**.

Example `D,4,20 ¦`

Defines a non-printable text field (field #4) with a maximum of 20 characters.

Defining Constant Text Fields

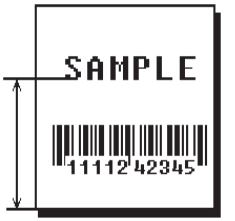
A constant text field is a set of fixed characters that prints on all labels. Define each constant text field separately. This field is not assigned a field number, but is counted as a field (keep this in mind, as the printer allows a maximum of **1000** fields per format). The characters in this field cannot be changed by batch data. Field options do not apply to constant text fields. Mark the pivot point of your field. This will vary, depending on how your field is justified.

Syntax

```
C,row,column,gap,font,hgt mag,
wid mag,color,alignment,char rot,
field rot,"fixed char",sym set ¦
```

C1. C Constant Text Field.

C2. row For monospaced fonts, distance from bottom of print area to the pivot point. For proportionally spaced fonts, distance from bottom of print area to baseline of characters in the field. (Bottom exits the printer first.)



Printer	Unit of Measure	Row or End Row	Column or End Column
9825/ 9855/ 9860	English Metric 203 dpi Dots	0-1599 0-4061 0-3246	0-399 0-1013 0-810
9855/ 9860	English Metric 300 dpi Dots	0-1199 0-3045 0-3597	0-399 0-1013 0-1197
9855RFMP/ 9855HF	English Metric 203 dpi Dots 300 dpi Dots	0-1299 0-3299 0-2637 0-3897	0-399 0-1013 0-810 0-1197

C3. column Distance from the lower left edge of the print area to the pivot point. Use the previous table for values.



C4. gap Number of dots between characters (203 dots per inch). Range: **0** to **99**.

Any number other than **0** or the default number affects your field width. Default spacing:

Standard		**3 dots**
Reduced		**1 dot**
Bold		**3 dots**
OCRA-like		**3 dots**
CG Triumvirate Typeface Bold		**varies with each letter**
CG Triumvirate	Typeface	**varies with each letter**

C5. font

Style of font. Options:

1	Standard	**10**	CG Triumvirate Typeface Bold
2	Reduced	**11**	CG Triumvirate Typeface
3	Bold	**15**	7 pt. CG Triumvirate Typeface
4	OCRA-like	**16**	9 pt. CG Triumvirate Typeface
5	HR1	**17**	11 pt. CG Triumvirate Typeface
6	HR2	**18**	15 pt. CG Triumvirate Typeface
		50	EFF Swiss Bold (TrueType® Scalable)
		56	PaxarSymbols (version 5.0 or greater)

Or a valid downloaded font selector number.
Fonts **5** and **6** are for numeric data only.
The CG Triumvirate typefaces support only the ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font does not support Code Page 1256 (Arabic). See Appendix C for more information.

C6. hgt mag

Height magnifier, **1** to **7** times (**4** to **255** points for scalable/downloaded TrueType fonts). Use a magnifier of **1** with proportionally spaced fonts, because characters lose smoothness at higher magnifications. See Appendix B, “Fonts,” for more information about fonts.

C7. wid mag

Width magnifier, **1** to **7** times (**4** to **255** points for scalable/downloaded TrueType fonts). Proportionally spaced fonts do not have a set width. To estimate the size of your field, use the letter “W” for the widest field or an “L” for an average width field. Find your selected font and the desired width in Appendix B, “Fonts.”

C8. color

There are two types of field color overlay attributes:

Transparent	The overlay field (text or constant text) does not block out (or “erase”) existing fields.
Opaque	The overlay field blocks out (or “erases”) existing fields.

Options for standard printer fonts:

B	Opaque, Normal, Black, Normal
D/R/W	Opaque, Normal, White, Normal
O	Transparent, Normal, Black, Normal

Options for scalable fonts:

A/N	Opaque, Normal, Black, Bold
B/O	Opaque, Normal, Black, Normal
E/S	Opaque, Italics, Black, Bold
F/T	Opaque, Italics, Black, Normal

Note: Solid black print should not exceed 30% on a given square inch of the label, or the printhead life may be decreased.

Field placement in the packet is an important consideration when using field color attributes. If a line field is defined before the overlay (text or constant text) field, the line field is blocked out by the overlay field, depending on the overlay field’s color attribute. If a line field is defined after the overlay field, the line field is not blocked out by the overlay field, regardless of the overlay field’s color attribute.

C9. alignment Alignment of constant text in the field. Options:

- **L** Align on left side of field.
- **C** Center text within field (for monospaced fonts only)
- **R** Align on right side of field (for monospaced fonts only)
- **B** Align at midpoint of field
- **E** Align at end of field.

Use **L**, **B**, or **E** for any font.

C10. char rot Character rotation. The field or supply does not rotate, only the characters do. Options:

- **0** Top of character points to top of field
- **1** Top of character points to left of field
- **2** Top of character points to bottom of field
- **3** Top of character points to right of field

Note: Font 50 and downloaded TrueType fonts do not support character rotation.

C11. field rot Field rotation. Field rotation rotates the whole field, not just the characters. Rotation is affected by the pivot point, which varies depending on how text is justified. Lower left corner of field is the pivot point. Options:

- **0** Top of overlay points to top of supply
- **1** Top of overlay points to left of supply
- **2** Top of overlay points to bottom of supply
- **3** Top of overlay points to right of supply

C12. "fixed char" Fixed characters to appear in the field. Maximum **2710** characters. Enclose in quotation marks.

C13. sym set Symbol set. Use **0** for the Internal Symbol Set. For scalable or TrueType fonts, use:

1	ANSI Symbol Set
100	Macintosh
101	Wingdings
102	Unicode (user input) for particular mapping
103	BIG5 (user input) for Unicode mapping
104	GB2312 (user input) for Unicode mapping
105	SJIS (user input) for Unicode mapping Code Page 932 (Japanese Shift-JIS)
106	GB2312 (user input) for GB2312 mapping Code Page 936 (Simplified Chinese)
107	BIG5 (user input) for BIG5 mapping Code Page 950 (Traditional Chinese)
110	Unicode UTF-8
437	DOS Code Page 437 (Domestic)
850	DOS Code Page 850 (International)
852	DOS Code Page 852 (Latin 2)
855	DOS Code Page 855 (Russian)
857	DOS Code Page 857 (IBM Turkish)
860	DOS Code Page 860 (MS-DOS Portuguese)
1250	Code Page 1250 (Latin 2)
1251	Code Page 1251 (Cyrillic)
1252	Code Page 1252 (Latin 1)
1253	Code Page 1253 (Greek)
1254	Code Page 1254 (Turkish)
1255	Code Page 1255 (Hebrew)
1256	Code Page 1256 (Arabic)
1257	Code Page 1257 (Baltic)
1258	Code Page 1258 (Vietnam)

Note: The Standard, Reduced, Bold, OCRA and HR fonts only support the Internal Symbol Set (0). The CG Triumvirate™ typefaces only support the ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font (font#50) does not support Code Page 1256 (Arabic). Code pages 852-860 and 1250-1258 are for downloaded TrueType fonts or the scalable font. Code pages 102-110 require the memory expansion option and a downloaded International TrueType font. TrueType fonts are designed to be regionally specific; therefore, all code pages may not be supported in a given font. See Appendix C, “Symbol Sets/ Code Pages” for more information.

If using symbol set 110 (Unicode UTF-8), set the MPCL control characters (start of header, etc.) to decimal values between **0** and **128**; otherwise, errors may occur with the Unicode data entered. See Chapter 2, "Configuring the Printer" for more information about the MPCL control characters.

Example `C,30,10,0,1,1,1,B,L,0,0,"MADE IN USA",0 ¦`

Defines a constant text field starting at row 30, column 10. It does not have any additional inter-character gap. The Standard font is used without any additional magnification. The printing is black on white and left justified. No field or character rotation is used. “MADE IN USA” is printed in this field. The internal symbol set is used.

Defining Line Fields

Use lines to form borders and mark out original prices. Define each line separately. This field is not assigned a field number, but is counted as a field (keep this in mind, as the printer allows a maximum of **1000** fields per format). You can define any line length and a thickness up to 99 dots, as long as the solid black print does not exceed 30 percent of any given square inch of the label.

Line Types

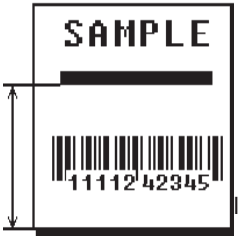
You can create horizontal and vertical lines. There are two ways to define lines.

Segments You choose the starting point and ending point.

Vectors You choose the starting point, the angle, and the length of the line.

Syntax

```
L,type,row,column,angle/end row,length/
end col,thickness,"pattern" ¦
```



L1. L Line Field.

L2. type Type of line. Only vertical and horizontal lines are supported. Options:
S Segment. You choose the starting point and ending point.
V Vector. You choose the starting point, angle, and engtth.

L3. row Distance from bottom of print area to the starting point.

Printer	Unit of Measure	Row or End Row	Column or End Column
9825/ 9855/ 9860	English Metric 203 dpi Dots	0-1599 0-4061 0-3246	0-399 0-1013 0-810
9855/ 9860	English Metric 300 dpi Dots	0-1199 0-3045 0-3597	0-399 0-1013 0-1197
9855RFMP/ 9855HF	English Metric 203 dpi Dots 300 dpi Dots	0-1299 0-3299 0-2637 0-3897	0-399 0-1013 0-810 0-1197

L4. column

Distance from left edge of the print area to line origin. Use the previous table for values.

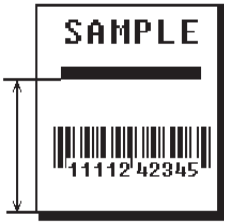


L5. angle /end row

If Using *Segments*:

Row location of ending point. Measure from bottom of print area. Ranges same as row above. On horizontal lines, this value must match item **L3**.

If Using *Vectors*:
Angle of line. Options: **0**, **90**, **180**, or **270**.



L6. length/ end col

If Using *Segments*:

Column location of end point. Measure from left edge of print area. Ranges same as column above. On vertical lines, this value must match parameter **L4**.

If Using *Vectors*:
Length of the line in selected units. Use the previous table for values.



L7. thickness Using the chart below for reference, write the line thickness (**1** to **99**) in box **L7**. Line thickness fills upward on horizontal lines, or to the right on vertical lines. Measured in dots.

Dots	Thickness
1	
10	
24	
48	
96	

L8. "pattern" Line pattern. Enter "".

Example

```
L,S,110,30,110,150,10,"" ¦
```

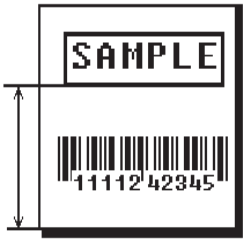
Defines a horizontal line field as a segment starting at row 110, column 30 and ending at row 110, column 150. The line thickness is 10 dots.

Defining Box Fields

Use boxes to form borders or highlight items of interest. Define each box field separately. This field is not assigned a field number, but is counted as a field (keep this in mind, as the printer allows a maximum of **1000** fields per format). You can define any line length and a thickness up to 99 dots, as long as the solid black print does not exceed 30 percent of any given square inch of the label.

Syntax `Q,row,column,end row,end col,thickness,"pattern" ¦`

Q1. Q Box (**Q**uadrilateral) Field.



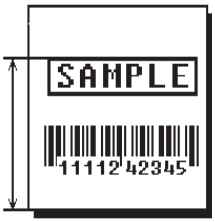
Q2. row Distance from bottom of print area to lower left corner of box.

Printer	Unit of Measure	Row or End Row	Column or End Column
9825/ 9855/ 9860	English Metric 203 dpi Dots	0-1599 0-4061 0-3246	0-399 0-1013 0-810
9855/ 9860	English Metric 300 dpi Dots	0-1199 0-3045 0-3597	0-399 0-1013 0-1197
9855RFMP/ 9855HF	English Metric 203 dpi Dots 300 dpi Dots	0-1299 0-3299 0-2637 0-3897	0-399 0-1013 0-810 0-1197

Q3. column Distance from left edge of print area to lower left corner of box. Use the previous table for values.



Q4. end row Distance from bottom of print area to upper right corner of box. Ranges same as *row*.



Q5. end col Distance from left edge of print area to upper right corner of box. Ranges same as *column*.



Q6. thickness Using the chart below for reference, write the desired line thickness (**1** to **99**) in box **Q6**. Boxes fill inward, so make sure your boxes do not overwrite other fields. Measured in dots.

Dots	Thickness
1	
10	
24	
48	
96	

Q7. "pattern" Line pattern. Enter "".

Example

```
Q,240,30,270,150,3,"" ¦
```

Defines a box field starting at row 240, column 30. It ends at row 270, column 150. It has a thickness of 3 dots.

Defining Verifier Fields

The verifier field in a format references the verifier configuration packet ID to use for this particular format. The verifier field allows you to specify a different verifier configuration packet for each format, regardless of the format number. See “Defining a Verifier Configuration Packet,” in Chapter 2 for more information.

The verifier field allows you to specify a different verifier configuration packet for each of your formats.

If you do not specify a particular verifier configuration packet, the last sent verifier configuration packet is used.

Syntax

```
V,vfrID ¦
```

V1. V Verifier Field.

V2. vfrID Unique number from **1** to **999** to identify the verifier configuration packet to use with this format.

Example

```
F,25,A,R,M,508,508,"FMT-25" ¦
V,3 ¦
B,1,12,F,110,115,1,2,120,5,L,0¦
```

Specifies verifier configuration packet #3 starting with format 25 until another verifier configuration packet is specified.

Defining the RFID Data Field

The RFID Data Field contains the information you want programmed into the RFID tag. The syntax of the RFID Data Field is similar to the standard non-printable text field format. **RFID is only supported on the 9855 printer.** Printing over the RFID tag (or transponder) causes printing irregularity. For more information about RFID, refer to the *Multi-Protocol Application Notes*, available on our Web site.

With version 2.8 or greater firmware, the printer supports both 64-bit and 96-bit RFID tags.

With version 3.2 or greater firmware, the printer supports multi-protocol encoding, including Class 1 Generation (Gen) 1 and Class 1 Generation (Gen) 2 supplies.

With version 5.0 or greater firmware, the printer accepts EPC data following the guidelines in the *EPCglobal Tag Data Standards*, which conforms to the *EPC Radio Frequency Identity Protocols Class 1 Generation 2 UHF RFID Protocol for Communications at 860-960MHz Standards* (Air Interface Protocol). See “Using Expanded Gen2 Data” in Chapter 6, “Printing,” for more information.

Syntax `X,field#,# of char,data_type ¦`

X1. X RFID Data Field.

X2. field# Unique number from **0** to **999** assigned to this field.

X3. # of char This number must be equal to or greater than the total number of characters in the RFID Data Field. Range: **0** to **2710**. The amount varies according to your RFID data and protocol. For example, C1Gen2 can be 96-Bits, plus the access password, lock code, etc.

Note: An error 715 occurs if the printer does not receive the correct amount of data.
You can pad data to make sure you have the correct amount of bits. See “Option 30,” in Chapter 4 for more information.

X4. data_type Data type. Options:

0 ASCII Hex - default (ASCII representation of Hex)
Use characters **A** to **F** and **0** to **9**.

1 ASCII

2 ASCII Binary (ASCII representation of Binary)
Use characters **0** and **1**.

3 Hex

We recommend using ASCII Hex for compatibility with multiple host applications.

For example, the letter A has a decimal value of 65 in the ASCII table. The hex (base 16) equivalent of decimal (base 10) is 41. Hex 41 in binary notation is 01000001.

Data Type	Character	MPCL Batch Data for a 96-bit RFID tag
ASCII Hex	41	“414141414141414141414141"
ASCII	A	“AAAAAAAAAAAA”
ASCII Binary	01000001	“010000010100000101000001010000010100000101000001 010000010100000101000001010000010100000101000001"
Hex	~065	“~065~065~065~065~065~065~065~065~065~065~065~065"

Example `X,5,24,0 ¦`

Defines an RFID Data Field (field #5) with exactly 24 ASCII Hex characters for a 96-bit RFID tag.

DEFINING FIELD OPTIONS

4

This chapter provides a reference for defining

- field options in formats
- check digit packets.

Note: When using multiple options on the printer, options are processed in the order they are received.

Applying Field Options

Field options further define text, bar code, and non-printable text fields. The text, constant text, or bar code field must be previously defined *before* you can apply any field option to it. Define options immediately after the field to which they apply.

Combining Field Options

You can use more than one option with most fields. For example, you can use Option 4 to copy data from another field, and then use Option 30 to pad the field. When you use multiple options for the same field, you must place the options in the order you want to apply them to your format.

Restrictions

Some options cannot be used together. For example, incrementing (Option 60) and price field (Option 42) options cannot be applied to the same field. Refer to the following sections addressing individual options for specific combinations to avoid.

Option 4 (copy a field) is the only option that can be repeated for a single field.

Example `R,1,3,1,3,1,1 ¦`

Syntax `R,option#,parameter...parameter ¦`

R1. R Indicates field option header.

R2. option# Option number:

1	Define fixed characters
2	Data type restrictions (9855/9860)
3	Data entry template (9855/9860)
4	Copy data from previous field
5	Define data entry sources (9855/9860)
6	Upload field data
20	Define data entry prompts (9855/9860)
21	Define extended field names (9855 XML-enabled printer)
30	Pad data to left or right with specified character
31	Generate check digit

42 Format as a price field
50 Define bar code densities
51 Define security and truncation of PDF417 bar codes
52 Define width or length of PDF417 bar codes
53 Define optional settings for Aztec bar codes
60 Define incrementing or decrementing field
61 Reimage fields
62 Do not scan/verify a particular bar code
64 Program the AFI Field for UHF RFID tags

R3. parameter(s) Varies per option. See the following option descriptions.

Applying Options to the RFID Data Field

All the normal field options (copy, merge, pad, increment, etc.) can be applied to the RFID Data Field. However, certain restrictions may apply.

To copy, merge, pad, or increment data in the RFID Data Field, the copied/merged/padded/incremented data **must** be in the same format specified in the RFID Data Field. For example, **to copy data into** the RFID Data Field using ASCII Hex, the field being copied **must** be in ASCII Hex format; otherwise, unexpected results may occur.

When incrementing the RFID Data Field, see the following table for an explanation of how the field increments.

Data Type	How the Field Increments
ASCII Hex	0 to F (0123456789ABCDEF), then back to 0
ASCII Binary	0 to 1 or 1 to 0
ASCII or Hex	next position in 0 to 255 range

If Option 60 (Increment Field) contains the character “D” to decrement, it is ignored and the field is instead incremented by one.

When incrementing the RFID Data Field, the only valid value to increment is by **one**.

Use caution when incrementing an RFID field if data is coming directly from your host because the field must be incremented in ASCII Hex (or other specified data type).

Option 1 (Fixed Data)

Fixed data is information (a company name or store number) you want to print on all labels. You can define fixed characters for an entire field or for part of a field.

Syntax `R,1,"fixed char" ¦`

R1. R Option Header.

R2. 1 Option **1**.

R3. fixed char Characters to insert. Enclose in quotation marks. If you are defining fixed characters for part of a field, place underscores(_) in non-fixed positions. Any spaces in the phrase are fixed characters. Range: **0** to **2710**.

Note: Underscore characters are stripped out and the data is compressed if no data is supplied by the batch and the field length is variable.

Example `R,1,"_ _ _%$_ _ _ _ _" ¦`

Uses fixed characters (%$) in positions 4 and 5. The other positions are variable.

Example `R,1,"MONARCH" ¦`

“MONARCH” appears as a fixed field in this example.

To fill in the non-fixed portion of the field, see “Defining Batch Data Fields” in Chapter 6. As an alternative, you can apply Option 4 to copy data into the non-fixed character positions.

Option 2 (Data Type Restrictions)

This option restricts the data type for a particular field. You can use Options 2 or 3 only once per field. Do not use with Option 3 (Data Entry Templates).

Note: Option 2 is only available on the 9855 and 9860 printers. You must use the Monarch® 939 keyboard for offline data entry.

If you do batch entry only in the batch packet, you do not need to apply Options 2 and 3. Use these options only for offline batch entry.

Syntax `R,2,char_code ¦`

R1. R Option Header.

R2. 2 Option 2.

R3. char code Character type for the field. Options:

- **1** Numeric only (0..9)
- **2** Letters only (A..Z,a..z)
- **3** Symbols only (printable characters other than letters or numbers)
- **4** Letters and numbers only
- **5** Numbers and symbols only
- **6** Letters and symbols only

Spaces are permitted in all categories. You can also use a combination of any two (letter, numbers, or symbols) character types.

Note: A use for this option is a quantity field, where the operator could enter only numeric data.

Example `R,2,2 ¦`

Restricts the field data to letters only (A-Z or a-z).

Option 3 (Data Entry Templates)

This option provides more specific restrictions than Option 2. This option can be used to select certain letters (such as A through F or the numbers 1 through 4) from a character set. You can also use this option to create a template of allowable characters for a field. Do not use with Option 2 (Data Type Restrictions).

Use this option only for offline batch entry. You can define a template up to 30 characters long, but the printer only displays 16 characters at a time. The character template must contain the same number of characters as the field.

Note: Option 3 is only available on the 9855 and 9860 printers. You must use the 939 keyboard for offline data entry.

Syntax `R,3,code,chars !`

R1. R Option Header.

R2. 3 Option 3.

R3. code Data types. Options

- **S** Defines a specific set of characters for the entire field. The string length does not have to match the field length. Maximum is 30 characters.
- **T** Creates a template of allowable data types by placing character indicators in each character position. The number of characters in the string must match the length of the field.

Note: A sample use for this option is a field on a patient record containing blood type. Acceptable characters would be A, B, O, +, or -.

R4. chars Characters to include in a field or a specific template. Must be enclosed within quotation marks. Indicators can be

- * any printable character
- # any digit 0-9
- @ any letter a-z, A-Z
- - no user input for this position (for fixed data or copied data)

Example `R,3,S,"ABC1234567890" ¦`

Restricts the field data to letters **A**, **B**, and **C**, and all digits.

Example `R,3,T,"***#_ _ _ _" ¦`

Creates a template that allows any printable character in positions 1, 2, and 3; digits in position 4; and reserves positions 5 through 8 for fixed or copied data.

Example `R,3,T,"####_ _ _ _" ¦`

Creates a template that allows digits only in positions 1-4, and reserves positions 5 through 8 for fixed or copied data.

Option 4 (Copy Data)

You can create a field that uses data from another field. This is useful for creating merged fields or sub-fields. You can copy the information from multiple fields into one field by applying the copy procedure more than once. Copy data is the only option you can apply to a field more than once.

The maximum number of characters defined in box **T3** or **B3** must allow for the number of characters you will place in the field, including any price, check digit, or fixed characters inserted by the printer. The maximum number of characters in the field into which data is copied cannot exceed **2710** or the maximum number of characters permitted by the **bar code**.

Note: When copying from more than one field, copy into the destination field from left to right.

Syntax

```
R,4,src fld,src start,# to copy,dest start,
copy code ¦
```

R1. R Field Option Header.

R2. 4 Option **4**.

R3. src fld Field number from which data is copied. Range: **0** to **999**.

R4. src start Position number in the source field of the first character to be copied. Character positions are numbered **1** to **2710**, starting from the left.

R5. # to copy Number of characters to copy. Range: **1** to **2710**.

R6. dest start Position number where copied characters are to begin printing in the destination field. Range: **1** to **2710**.

R7. copy code Copy Method.

- **1** Copy field as is (including price symbols, pad characters, check digits, etc.).
- **2** Copy unformatted data (without price characters, pad characters, etc.).

Example

```
R,4,3,1,3,1,1 ¦
```

Copies data from field #3, starting at the first position and copying three characters. In the destination field, the information is placed in position 1 and copied as formatted data.

Example

```
R {F,2,A,R,E,400,400,"ASCIIHEX" ¦
X,2,24,0 ¦
T,1,50,V,10,10,0,1,1,1,B,L,0,0 ¦
R,4,2,1,16,1,2 ¦ }

{B,2,N,2¦
1,"313233343536373831323334" ¦
2,"313233343536373831323334" ¦ }
```

This example uses Option 4 to copy data from the RFID Data Field and displays the data in text field 1. Note the data type being used is ASCII Hex, so the data in the RFID Data Field is in ASCII Hex format. This example uses a 96-bit RFID tag.

Merging Fields

You can copy data to merge the contents of fields. Use the copy data option as many times as necessary to copy all the appropriate fields into the merged field.

In the following example, two text and two non-printable fields are shown. Data from these fields is merged to form field 5, and is then printed as a bar code.

Field	Data	Field Type
1	203	Non-printable
2	339	Non-printable
3	8	Text
4	BLUE	Text
5	2033398BLUE	Bar Code

To create this sequence:

1. Define fields 1, 2, 3, and 4.
2. Define field 5 as a bar code. Allow enough characters in the bar code field to hold all the copied characters.
3. Apply Option 4 to field 5 once for every source field.

Sub-Fields

You can copy a segment of data from one field into a new location, called a sub-field. For example, extract part of the data in a bar code and display it in text form in a sub-field. Then, use the copy data option.

Option 5 (Define Data Entry Sources)

Defines how data is entered into a field. Option 5 is required for offline data entry. If the field holds all fixed characters or copied data only, you can eliminate the operator prompt. Use Option 5 only once per field. You must use the 939 keyboard for offline data entry.

Use this option to read pre-programmed data in the RFID chip embedded within the supply. Using Option 5 stops the printer while reading each label; regardless of the print speed. If using a batch quantity greater than one, the data is read from each label.

Note: Using Option 5 to read pre-programmed RFID data is supported with the release of version 5.0 or greater printer's software.
The EM4122 protocol requires Option 5 to read the pre-programmed data.

When reading data, make sure the maximum number of characters in the field is equal to or greater than the number of characters being read. If not, the data may be incomplete.

Use option 6 (Upload Field Data) with Option 5 to upload the data from the RFID chip to a host.

Syntax `R,5,code ¦`

R1. R Option Header.

R2. 5 Option **5**.

R3. code Input code for the data in the field. Options:

- **H** Host
- **K** Keypad
- **N** No user input for this field
- **R** RFID (read data from the RFID chip) This is ignored on non-RFID printers.

Note: Option 5 re-images each label in the batch.

Example `R,5,K ¦`

Allows data to be entered from the keypad.

Example `R,5,N ¦`

Eliminates the user prompt for this field. Data is either fixed or copied from another source.

Example

```
T,2,10,V,250,50,0,1,1,1,B,C,0,0,0 ¦
R,5,R ¦
```

Reads the pre-programmed data from the RFID chip and saves that data into the text field.

Option 6 (Upload Field Data)

You can upload data from any field using Option 6. When uploading multiple fields of data, the data is comma separated.

Data is uploaded to the last port that received host data (serial, parallel, USB, or Ethernet) at the end of the batch or label, depending on the other options used as follows:

When using a batch quantity of one without Option 5 or Option 60, data is uploaded at the end of the batch.

When using a batch quantity greater than one with an Option 5 and/or Option 60, data is uploaded after each label.

Note: To upload data on a field that did not change, apply Option 60 to that field.

Syntax

```
R,6,device ¦
```

R1. R Option Header.

R2. 6 Option **6**.

R3. device Last port that received host data. Use **H** (host).

Example

```
T,2,10,V,250,50,0,1,1,1,B,C,0,0,0 ¦
R,6,H ¦
```

Uploads the text field's data to a file.

Example

```
B,3,12,F,50,50,1,2,60,7,L,0 ¦
R,6,H ¦
R,60,I,0 ¦
```

Uploads the UPCA bar code field's data to a file and uploads data for each label in the batch.

Example

```
T,150,V,230,130,0,1,1,1,B,L,0,0 ¦
R,5,R ¦
R,6,H ¦
```

Reads the RFID data from the RFID chip embedded in the supply. Uploads the data to the last-used port.

Example

```
{F,1,A,R,E,600,400,"RDCI" ¦
X,5,24,0 ¦
T,6,20,V,415,270,0,50,15,15,B,L,0,2 ¦
R,4,5,1,16,1,0 ¦
R,6,H ¦}
```

Copies data from field 5 (RFID Data Field) to field 6 (Text field). Uploads the data to the last-used port

Sample Upload Packet

Example

```
R,5,R ¦
R,6,H¦
```

Returns the following in the upload packet:

```
313233343536373839303132
```

Example

```
B,3,12,F,50,50,1,2,60,7,L,0 ¦
R,6,H ¦
```

Returns the following in the upload packet:

```
123456789012
```

Example

```
R,5,R ¦
R,6,H ¦
B,3,12,F,50,50,1,2,60,7,L,0 ¦
R,6,H ¦
```

Returns the following in the upload packet:

```
313233343536373839303132,123456789012
```

Option 20 (Define Data Entry Prompts)

This option defines the operator prompt and it is not recommended on fields filled entirely by fixed characters or copied data. This option must be defined before Option 5, or the prompt does not display during data entry. You must use the 939 keyboard for offline data entry.

Note: Option 20 is only available on the 9855 and 9860 printers.

Syntax

```
R,20,"prompt" ¦
```

R1. R Option Header.

R2. 6 Option **20**.

R3. device Displays the exact phrase you want to prompt the operator. Must be enclosed within quotations. The prompt must be 15 characters or less.

Example

```
R,20,"Order Number" ¦
```

Displays the prompt "Order Number" for the operator when this field is imaged.

Option 21 (Define Extended Field Names)

This option defines names for each field in a format, which can be longer than eight characters. This option is only available on the 9855 XML-enabled printer.

Syntax `R,21,"field_name" ¦`

R1. R Option Header.

R2. 21 Option **21**.

R3. "field_name" Specifies the field name. Must be enclosed within quotations. The name can be **1** to **256** characters, excluding non-printable control characters and the quotation mark (“). This name must match the one specified in the variable name attribute.

Example

```
T,2,10,v,250,50,0,1,1,1,B,C,0,0,0 ¦
R,21,"SALEPRICE_FIELD" ¦
```

Defines the name for text field 2 as “SALEPRICE_FIELD.”

Option 30 (Pad Data)

You can add characters to one side of a field to “pad” the field. Padding allows you to fill in the remaining spaces when the entered data does not fill an entire field. If a variable length field is not completely filled with batch data, this option fills the remaining positions in the field with the character designated by Option 30.

Syntax `R,30,L/R,"character" ¦`

R1. R Option Header.

R2. 30 Option **30**.

R3. L/R Indicates type of padding:

- **L** Pad field on left side
- **R** Pad field on right side

R4. "character" Pad character must be within the **0** to **255** decimal range and enclosed inside quotation marks. The pad character must be in the same format specified in the RFID Data Field. See “Defining the RFID Data Field” for more information. Do not use on fixed length fields.

Example `R,30,L,"X" ¦`

Pads data with an “X” on the left side of the field.

Example
```
X,2,24,0 ¦
R,30,R,"0" ¦
```

Pads the data in the RFID Data Field with a “0" on the right side.

Sample Use for Padding

If you have a variable length bar code that you want to occupy a fixed amount of space on the supply, use pad characters. If the maximum number of characters in the bar code is 15, but the batch record only has 10 characters, the padding option fills the remainder of the field with pad characters.

Option 31 (Calculate Check Digit)

The printer generates a check digit if you apply Option 31 to the field. You cannot use this option if the field contains a UPC, EAN, or Code 39 (with the MOD43 check digit) bar code.

Syntax `R,31,gen/ver,check digit # ¦`

R1. R Option Header.

R2. 31 Option **31**.

R3. gen/ver Enter **G** to generate a check digit.

R4. check digit # Specifies a check digit scheme. Enter a number that identifies a check digit scheme that has been defined. For more information, see “Using Check Digits.” Range: **1** to **10**.

Example `R,31,G,5 ¦`

Generates a check digit using the previously defined check digit scheme 5.

Option 42 (Price Field)

You can apply options that will insert monetary symbols automatically. Do not use this option with Option 31 (define a check digit) or Option 60 (increment or decrement a field). This option is not recommended for bar codes. When determining the maximum number of characters, add the maximum number of digits and the monetary symbols.

Syntax `R,42,appearance code ¦`

R1. R Option Header.

R2. 42 Option **42**.

R3. appearance code Enter **1** to print price field in standard notation, as defined by country setting.

Use the monetary formatting packet to select monetary notations and symbols by country setting. See “Defining the Monetary Formatting Packet” for more information.
See Appendix C, “Symbol Sets/Code Pages,” to make sure the monetary symbol you want to use is printable in the font selected for this field. For monetary symbols other than the dollar sign, use the internal symbol set.

Example `R,42,1 ¦`

Uses a price field that prints the monetary symbol and notations as defined in the monetary formatting packet.

Option 50 (Bar Code Density)

You can apply this option to bar code fields when you want to create custom densities. When you apply this option, it overrides the density value in the bar code field. When using this option, set the density parameter in your bar code field to the default value. You can only use this option once for each bar code field.

Bar codes produced using Option 50 may not be scannable. Code 39, density 12, produces a one-dot narrow bar. This density is intended for special U.S.P.S. ACT-tag applications only. Synthetic supplies are recommended to produce scannable bar codes.

The additional character gap, narrow space, and wide space parameters are valid **only** with Code 39 and Codabar. If these parameters are specified for any other bar codes, they will be ignored by the printer. Do not use Option 50 with fixed density bar codes.

Option 50 can be used with PDF417 bar codes for specific customer ratios. With PDF417 bar codes, use only the narrow and wide parameters. The narrow parameter defines the individual bar width in dots and the wide parameter is used to define the height of each individual stacked bar code. Option 50 can also be used with Option 52 to further customize the dimensions of a PDF417 bar code. Option 52 allows customization of the number of columns or number of rows for the bar code.

Syntax `R,50,narrow,wide,gap,nar_space,wide_space ¦`

R1. R Field Option Header.

R2. 50 Option **50**.

R3. narrow Dot width of the narrow element. Range: **1** to **99**.

R4. wide Dot width of the wide element. Range: **1** to **99**.

R5. gap Additional dot space between characters. Enter a value of **1** to **99**. (Code 39 and Codabar only.)

R6. nar_space Additional dot width of the narrow bar code space. (Code 39 and Codabar only). Range: **1** to **99**.

R7. wide_space Additional dot width of the wide bar code space. (Code 39 and Codabar only). Range: **1** to **99**.

Example

```
R,50,4,8,4,4,8 ¦
```

Creates a custom bar code density with a narrow element of 4 dots, a wide element of 8 dots, a gap of 4 dots, 4 additional dot widths for the narrow bar code space, and 8 additonal dot widths for the wide bar code space (if this is a Code 39 or Codabar bar code).

Example

```
B,1,40,V,100,100,32,1,0,8,L,0 ¦
R,50,2,10¦
```

Creates a custom PDF417 bar code density for 203 dpi printers. The narrow element width is 2 dots and the height is 10 dots.

Example

```
B,1,40,V,100,100,32,1,0,8,L,0 ¦
50,3,15 ¦
```

Creates a custom PDF417 bar code density for 300 dpi printers. The narrow element width is 3 dots and the height is 15 dots.

Option 51 (PDF417 Security/Truncation)

You can define a security level and choose whether or not to truncate a PDF417 bar code. Higher security levels add data to a bar code, improving scan reliability. Some damaged bar codes may still be scannable if the security level is high enough. You can use this option to create standard PDF417 bar codes or use the truncated option to create a narrower bar code. This option can appear only once per PDF417 field, in any order, following the bar code field.

As the security level is increased, so is the size of your PDF417 bar code. For each level increased, the bar code will double in size.

Syntax `R,51,security,stand/default ¦`

R1. R Option Header.

R2. 51 Indicates Option **51**.

R3. security Security level ranges from **0** to **8** (**0** is the default).

Higher security levels add data to a bar code, improving scan reliability. Some damaged bar codes may still be scannable if the security level is high enough.

R4. stand/def Truncation selector. Valid values:

- **S** (default) a standard PDF417 bar code
- **T** truncated

Example `R,51,2,S ¦`

Defines a security level of 2 for a standard PDF417 bar code.

Option 52 (PDF417 Width/Length)

This option defines the image width or length of a PDF417 bar code. If you define a fixed number of columns (width), the bar code expands in length. If you define a fixed number of rows (length), the bar code expands in width.

Column value does not include start/stop or left/right indicator columns.

If this option does not immediately follow the PDF417 bar code field, the default settings are used. You can only use this option once per PDF417 bar code field.

Syntax `R,52,row/column,dimension ¦`

R1. R Option Header.

R2. 52 Indicates Option **52**.

R3. row/column Indicates if you are defining the number of rows or columns.

- **R** Row
- **C** Column

If you specify rows, the bar code expands in columns, or vice versa.

R4. dimension The number of rows or columns defined for the bar code. The default is **4**. Valid values:

- **3-90** for rows
- **1-30** for columns

Example `R,52,C,10 ¦`

Defines the column width of 10, which expands the PDF417 bar code length by 10.

Option 53 (Optional Settings for Aztec)

You can use Option 53 to set the error control level, enable ECI data, enable a menu symbol, and add appended data to an Aztec bar code.

Note: Typically, these settings are not used. When using Option 53, the printer may take longer to image the bar code and require more time to print the format.

Syntax `R,53,error_ctrl,ECI,menu_sym,str_append,"string"¦`

R1. R Option Header.

R2. 53 Option 53.

R3. error_ctrl Error control level. Some damaged bar codes may still be scannable if the error control level is high enough. Options:

0 Default level
1-99
101-104
201-232
300

R4. ECI Sets the ECI Data flag. The default is **0**. Options:

0 Disable
1 Enable

R5. menu_sym Sets the Menu Symbol flag. The default is **0**. Options:

0 Disable
1 Enable

R6. str_append Structured append information. Range: **1-26**. The default is **1**.

R7. "string" String to append. Range: **0-24**. The default is "". Must be enclosed in quotation marks.

Example `R,53,0,0,0,1,""¦`

Uses option 53 to set the error control to 0, disables the ECI data and menu symbol flags, and does not append any data to the bar code.

Option 60 (Incrementing/Decrementing Fields)

You may have an application, such as serial numbers, in which you need a numeric field to increment (increase in value) or decrement (decrease in value) on successive tickets within a single batch. Incrementing or decrementing can be applied to **numeric** data only. If you have a field that includes letters and digits, apply incrementing or decrementing to only the portion of the field that contains digits. Do not use with Option 42 (price field).

Syntax `R,60,I/D,amount,l pos,r pos ¦`

R1. R Option Header.

R2. 60 Option 60.

R3. I/D Increment or decrement:
- **I** incrementing field
- **D** decrementing field

R4. amount Amount to increase or decrease. Range: **0** to **999**.

R5. l pos Leftmost position in inc/dec portion of field. If this value is not entered, the default value 1 is used. Range: **0** to **2710**.

R6. r pos Rightmost position in inc/dec portion of field. If this value is not used, the entire field length is used as the default. Range: **0** to **2710**.

Example `R,60,I,5,1,6 ¦`

Increments a field by 5 each time the field is printed. The field increments beginning with the first left position and ending with the sixth position.

Fixing the First Number in the Incrementing Sequence

There are two ways to enter the first number in the incrementing sequence. You can use batch data or use Option 1 to define the first number as a fixed character. The first number in the sequence must contain the same amount of digits as the highest number to be counted. For example, to count the numbers **1** to **999**, the first number in the sequence must be entered as **001**.

Option 61 (Re-image Field)

This option redraws (reimages) a constant field when you have a constant field next to a variable field on your label. It can be used on text, constant text, bar code, line, or box fields.

These printers do not redraw an area if the field data does not change. When a field changes, that area is cleared and the new field data is imaged. However, the new field data may require a larger area than the previous field did. In some cases, neighboring fields that do not change (constant fields) may be covered with white space from the changing field's (variable fields) area. Use this option to reimage the constant field, or it may appear broken.

Note: The most common use for this option is with incrementing fields on your label, because they may cover a constant field.

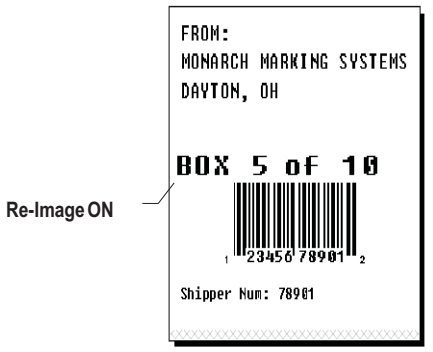
Syntax `R,61 ¦`

R1. R Option Header.

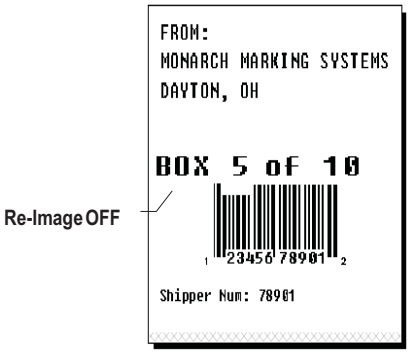
R2. 61 Option **61**.

Example `R,61`

Reimages the constant field that appears next to a variable field.



Re-Image ON



Re-Image OFF

In the above example, Option 61 was applied to the bar code field to keep the incrementing field (Box #) from blocking out the bar code field.

Option 62 (Bypass Bar Code)

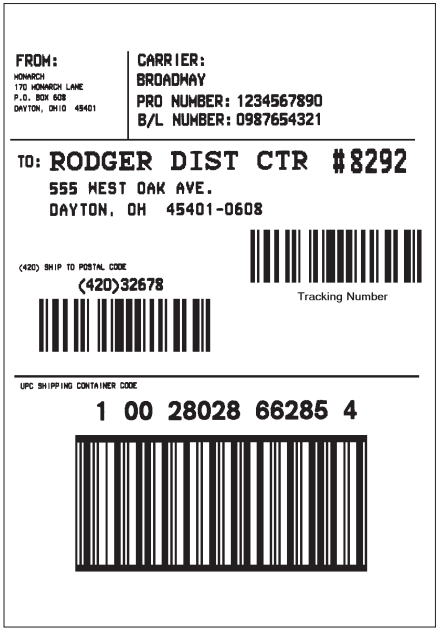
This option allows the optional verifier to bypass (skip) bar code(s) on a format. The verifier does not scan any bar code with Option 62 applied to it.

Syntax `R,62 ¦`

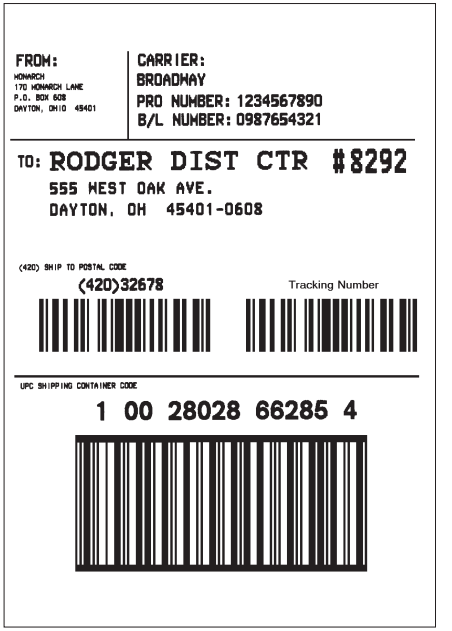
R1. R Option Header.

R2. 62 Option **62**. The verifier does not scan the bar code associated with this option.

Note: Adjacent bar codes on a format need to start and end on the same row (be the same height). Also, both adjacent bar codes (or neither bar code) must be scanned. However, do not apply Option 62 to all bar codes on a format or 764 errors appear.



Option 62 can be applied to any bar code on this format.



Option 62 must be applied to BOTH adjacent bar codes.

The verifier's beam scans the entire width of the label. It cannot scan half the label's width. The verifier errors if Option 62 is applied to only ONE of the adjacent bar codes.

Example

```
B,1,12,F,110,115,1,2,120,5,L,0 ¦
R,62¦
```

The verifier does not scan or verify this UPCA bar code on the format.

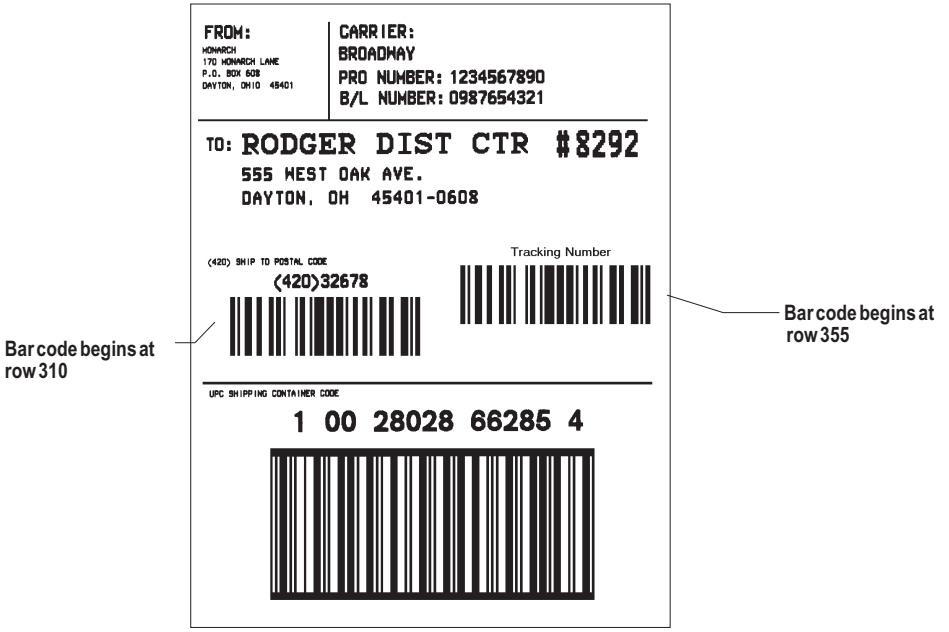
Verifier Information

There is a 0.50-inch no scan zone on the trailing edge of each label.

You cannot verify adjacent bar codes that do not start and end on the same print row. See the following graphic.

```
B,3,13,V,310,28,8,4,50,8,L,0 ¦
```
Postal Code Bar code

```
B,4,13,V,355,200,8,4,50,8,L,0¦
```
Tracking Number Bar code



The verifier cannot verify the "postal code" and "tracking number" bar codes, because they do not start and end on the same row.

Option 64 (Program AFI Field for UHF RFID)

Use Option 64 to program the AFI memory in the EPC memory bank (field) for UHF RFID tags. Unlike the AFI field for HF tags, currently, the AFI field cannot be locked for UHF tags.

Note: Do not apply a lock to the EPC memory bank since the AFI memory is part of the EPC memory bank. If the EPC memory bank is locked, the AFI memory cannot be programmed (the printer errors).

For more information about using EPC data or locking fields, refer to the *Multi-Protocol Application Notes* (available on our Web site).

Syntax `R,64,field,"code",lock¦`

R1. R Option Header.

R2. 64 Option 64.

R3. field Memory field to program. Use **A** (AFI).

R4. "code" Byte code. This is an 8-bit (1 byte) character to program, enclosed within quotation marks. Range: **0-255**. Use the ASCII character or the tilde followed by the equivalent three-character decimal value. For example, the letter "A" can be entered as "A" or "~041".

R5. lock Lock code. Use **0** (no lock).

Example

```
X,5,16,0,0¦
R,64,A,"A",0¦
```

Programs the character "A" into the **A**FI memory field. The data is not locked (**0**).

Example

```
X,5,16,0,0¦
R,64,A,"~046",0¦
```

Programs the character "F" into the **A**FI memory field. The data is not locked (**0**).

Using Check Digits

Check digits are typically used to ensure that a text or bar code field scans correctly. If you apply Option 31, the printer calculates a check digit. A check digit scheme determines how the printer calculates a check digit. When you define a check digit scheme, you assign a number to identify it. This number is later entered in box **R4** when you apply Option 31 to a field. You can use check digits with text or bar code fields. Check digit calculations are performed on numeric data only.

Do not use check digits with price fields. Do not define a check digit scheme for UPC, EAN, Code 39 (with the MOD43 check digit), and Code 93 bar codes, because they have predefined check digits.

Syntax

```
{A,selector,action,device,modulus,
fld_length,D/P,"weights" ¦ }
```

A1. A — Check Digit Header.

A2. selector — Assign a number from **1** to **10** to this check digit formula.

A3. action — The action to perform. Enter **A** to add the check digit scheme.

A4. device — Format storage device. Options:

- **F** Flash (must be formatted first. See "Formatting Flash" and "Flash Memory Guidelines" in Chapter 2 for more information.)
- **R** Volatile RAM

Note: Check digits stored in flash are saved when the printer is turned off.

A5. modulus — Number from **2** to **11**. The modulus is used to divide the sum of products or the sum of digits.

A6. fld_length — The maximum number of characters the field will contain. Range: **0** to **2710**.

A7. D/P — Algorithm. The algorithm determines how the check digit is calculated. Options:

- **D** sum of digits
- **P** sum of products

A8. "weights" — String of digits used for calculation. A weight string is a group of two or more numbers that is applied to a field. The number of digits in this string should equal the number in fld_length. Enclose in quotation marks. Range: **0** to **2710**.

Example `{A,1,A,R,10,5,P,"65432" ¦}`

Adds check digit scheme number 1 to the printer's memory. The modulus is 10, the maximum number of characters in the field is 5. The check digit is calculated by using the Sum of Products and the string of digits used in the calculation is "65432."

Sum of Products Calculation

This is an example of how the printer uses Sum of Products to calculate a check digit for this data:

```
5 2 3 2 4 5 2 1 9
```

1. Weights are applied to each digit, starting with the last digit in the weight string. They are applied right to left, beginning at the right-most position of the field. Remember, a weight string must contain at least two different numbers. This example has a weight string of **1,2,3,4**:

field:	5 2 3 2 4 5 2 1 9
weight string:	4 1 2 3 4 1 2 3 4

2. Each digit in the field is multiplied by the weight assigned to it:

field:	5 2 3 2 4 5 2 1 9
weight string:	4 1 2 3 4 1 2 3 4
products:	20 2 6 6 16 5 4 3 36

3. Next, the product of each digit is added together. This is the sum of the products.

```
20 + 2 + 6 + 6 + 16 + 5 + 4 + 3 + 36 = 98
```

4. Divide the sum of the products by the modulus (10 in this case), only to the whole number. The balance is called the remainder.

```
    9
10 ⌈98
   90
    8
```

5. Subtract the remainder from the modulus.

   The result becomes the check digit. In this case, the check digit is 2.

   10 – 8 = 2

Sum of Digits Calculation

This is an example of how the printer uses Sum of Digits to calculate a check digit for this data:

5 2 3 2 4 5 2 1 9

1. Weights are applied to each digit, starting with the last digit in the weight string. They are applied right to left, beginning at the right-most position of the field. Remember, a weight string must contain at least two different numbers. This example has a weight string of **1,2,3,4**:

field:	5 2 3 2 4 5 2 1 9
weight string:	4 1 2 3 4 1 2 3 4

2. Each digit in the field is multiplied by the weight assigned to it:

field:	5 2 3 2 4 5 2 1 9
weight string:	4 1 2 3 4 1 2 3 4
products:	20 2 6 6 16 5 4 3 36

3. Next, the digits of the products are added together. Two-digit products are treated as two separate digits.
   This is the sum of the digits.

   2 + 0 + 2 + 6 + 6 + 1 + 6 + 5 + 4 + 3 + 3 + 6 = 44

4. Divide the sum of the digits by the modulus (10 in this case), only to the whole number. The balance is called the remainder.

```
     4
10 ⌊44
   40
    4
```

5. Subtract the remainder from the modulus.

   The result becomes the check digit. In this case, the check digit is 6.

   ```
   10 - 4 = 6
   ```

CREATING GRAPHICS

5

This chapter provides information on how to

- map out the graphic image using the hexadecimal (hex) or run length method.
- create a graphic packet using a graphic header, bitmap, duplicate, next-bitmap, text, constant text, line, and box fields.
- place a graphic image into a format.

You can use graphic packets to create bitmapped images. To include a graphic packet within your format, your format **must** contain a graphic field. See “Placing the Graphic in a Format” for more information.

Overview of Compliance Labels

You can create compliance labels by using a graphic packet for the fixed fields and a format packet for the variable fields of your compliance label. The fixed fields of a compliance label are composed of text, lines, or boxes, which are repeated on each label. The variable fields are composed of text, bar codes, and order information, which changes with each label. Using a graphic packet for the fixed fields saves time, because the printer does not have to image all the lines or boxes each time the compliance label is printed.

Also, using a graphic packet for a compliance label reduces the number of fields in your format. Formats have a maximum number of fields per packet (**0** to **999**). However, you can bypass that requirement by placing your compliance layout in a graphic packet. When you process your formats, you only need one line in the format packet to reference the graphic packet.

The following example shows how to reference a graphic packet from within a format packet.

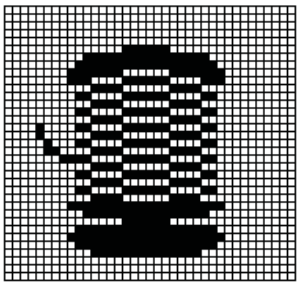
`{`	start of header
`F,1,A,R,E,400,400,"RDCI"¦`	format header
`G,57,0,0,0,0¦`	reference to graphic packet
`C,40,10,0,2,2,2,B,L,0,0,"To:",0¦`	constant text field
`B,2,13,V,310,30,8,4,50,8,L,0¦`	bar code field
`}`	end of header

Once you have your compliance label format set, all you need to do is add the variable sections (bar codes, addresses, and order information) to the format packet.

To see a sample compliance label graphic packet, see “Sample Compliance Graphic Packet.” To see a sample compliance label using a graphic packet within a format, see “Sample Compliance Label.”

Overview of Bitmapped Images

A printed image is formed through a series of dots. Each square on the grid below represents a dot on the printhead. The graphic image is created by blackening dots in a specific pattern. You can print varying shades of gray according to the concentration of dots on the image. When the dots are printed together, the end result is a graphic image.



Determining a Method

You can use one of two methods to map out your graphic image:

Hex Method The dot sequences are segmented into binary numbers and then converted to hex numbers.

A graphic using gray-scaling, several slanted lines, or several vertical lines typically translates more efficiently with hex representation.

Run Length Encoding Method The dot sequences are segmented into black and white strings within a row. The total count of each white string is converted to a lower-case letter, corresponding to numeric value. The total count of each black string is converted to an uppercase letter, corresponding to numeric value. This method can reduce imaging time for graphics that contain repetitive rows of dots. A graphic with horizontal lines or very few white-to-black borders typically translates more efficiently with run length encoding.

The most efficient encoding method depends on how complicated your graphic image is and whether or not imaging time is a concern. You may want to experiment with both encoding methods to get optimal performance.

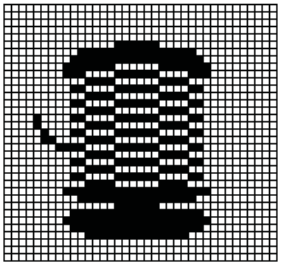
Designing Compliance Labels

To use a graphic packet to design your compliance label:

1. Decide which fields are fixed (constant text, lines, boxes) and which fields are variable (addresses and shipping information).
2. Design your compliance label as you would any other format.

Designing Bitmapped Images

Once you determine the encoding method to use, you can begin mapping out your graphic image.

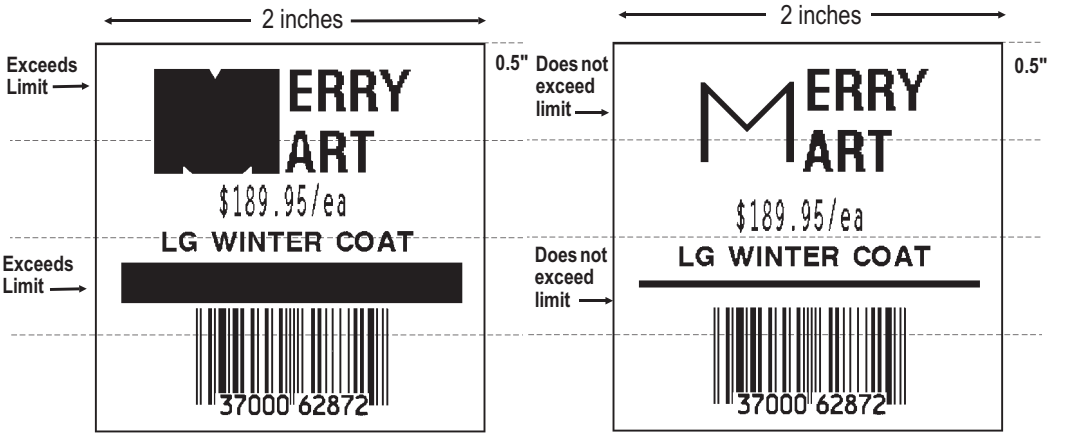


Note: The image that you map must be an upside down mirror image of the final result.

Special Considerations

Solid black print cannot exceed 30% of any given square inch of the supply. If the black print exceeds this limit, you may lose data or damage the printhead.

In the first label, the large “M” logo and thick black line exceed the allowed black to white print ratio. In the second label, the large “M” logo does not exceed the black to white print ratio.



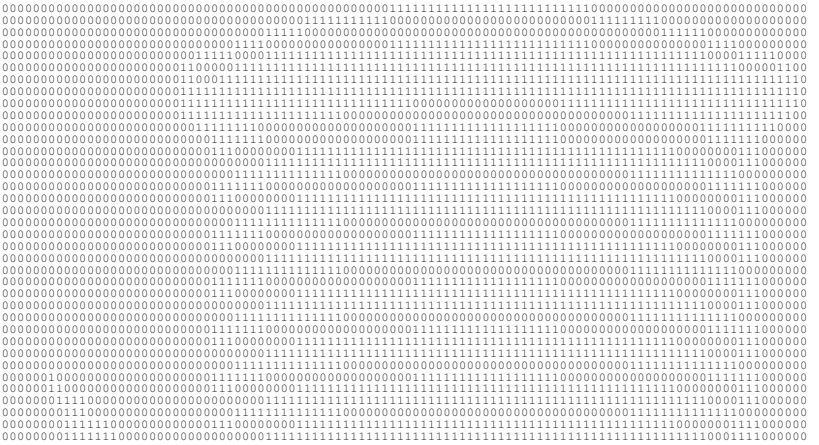
Using the Hex Method

The following steps explain how to derive a hex character string from a bitmapped graphic.

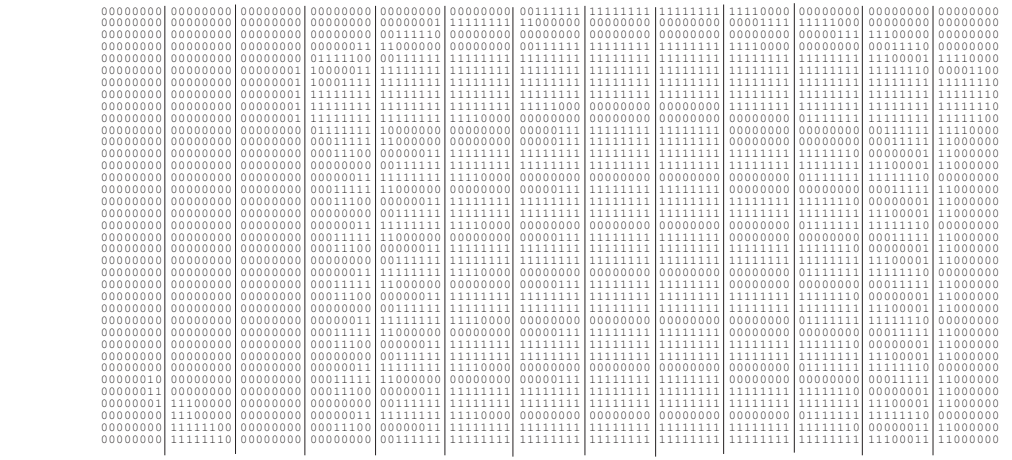
Each square on the grid represents a dot. A black square indicates the dot is ON, and a white square indicates the dot is OFF. A sequence of binary numbers, called a bit pattern or bitmap, determines what dots are on and off. The numbers “0" and ”1" are used for this purpose. The number “1" turns a dot on and ”0" turns a dot off.

All hex numbers must be two digits. For example, write hex 0 as 00, or hex E as 0E.

1. Assign 1 to every black square and 0 to every white square.



2. Section off the grid in columns of eight. If any rows are not divisible by 8, add enough 0's to complete a column.



3. One row at a time, convert each group of eight binary digits to hex.

```
starting at position 49 ...

00111111 = 3F
11111111 = FF
11111111 = FF
11110000 = F0
```

4. Write the hex values for each row as a continuous string.

```
row 1, position 49 = 03FFFFFF00000
```

5. Repeat steps **3** through **4** for each row on the grid.

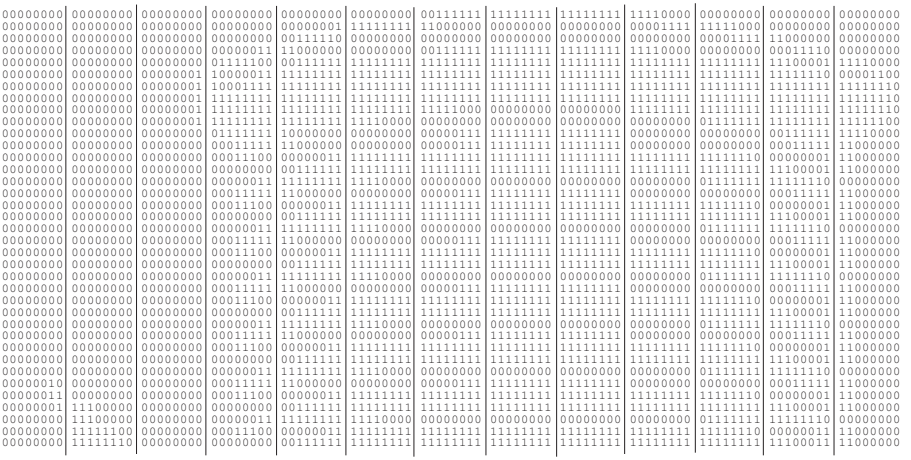
6. Insert the hex values in syntax format.

Using the Run Length Encoding Method

The following steps explain how to derive a run length character string from a bitmapped graphic.

Each square on the grid represents a dot. A black square indicates the dot is ON, and a white square indicates the dot is OFF.

Note: The following example shows “1" to indicate when a square is ON, and ”0" to indicate when a square is OFF. You do not have to convert your dots when using the run length method.



1. Count the number of consecutive OFF or ON dots in a row. Write the number of consecutive dots in sequence for the first row on the grid. Write “ON” or “OFF” after each number to indicate ON or OFF dots.

   ```
   (row 1, position 50) 26 on
   (row 2, position 39) 11 on, 26 off, 9 on
   (row 3, position 34) 5 on, 45 off, 6 on
   ```

2. Replace each number you have written with its corresponding code from the Dot to Run Length Encoding Chart provided in Appendix C, “Symbol Sets/Code Pages.” Be sure to use CAPITAL letters for black dots and lower-case letters for white dots.

   ```
   26 on (Z)
   11 on (K), 26 off (z), 9 on (I)
   .
   .
   ```

If the number is greater than 26, write z, followed by the letter corresponding to the amount over 26. For example, to represent 45 off dots, write zs.

```
5 on (E), 45 off (zs), 6 on (F)
.
.
```

3. Write the letter codes in sequence, uninterrupted, for each row.

```
(row 1,position 50) Z
(row 2,position 39) KzI
(row 3,position 34) EzsF
(row 4,position 30) DpZoD
.
.
```

Note: If the end of the line specifies OFF dots (lower-case letters), the ending lower-case letters can be omitted. For example, uZFu can be written as uZF.

4. Repeat steps 1 through 5 for each row on the grid.

5. Insert the code values in syntax format.

Determining How to Store the Image

Once you have mapped out your graphic image, determine how you want to store it. You have several options:

Flash

Volatile RAM

Temporary Storage

Using Flash

Use flash memory when the graphic image is used by several formats, because the graphic only has to be sent once. This eliminates the need to send the graphic image repeatedly. See “Placing the Graphic in a Format,” for more information about using the graphic packet in a format. Format flash memory before you can use it. From the Main Menu, select Setup, Flash Memory, then, Format Flash. The process takes a few minutes. **Graphics stored in flash memory are saved when the printer is turned off**. You may need to clear flash memory, refer to your *Operator’s Handbook*.

Using Volatile RAM

You should use RAM when the graphic image is used by several formats, because you only have to send the graphic image once. This eliminates the need to send the graphic image repeatedly. See “Placing the Graphic in a Format,” for more information about using the graphic packet in a format. Graphics smaller than approximately 1/2 inch by 1/2 inch can be stored in printer RAM and referenced by the graphic ID number.

Note: Graphics are stored in the format buffer and remain there until another graphic packet is sent or the printer is turned off.

Using Temporary Storage

You should use temporary storage when the graphic image is used only in one format or your graphic image is very large. Graphic data in temporary storage is held in the image buffer until the graphic is printed and then it is cleared from memory. Temporary graphics are also cleared from memory when you send a new batch or update batch. You can use the same graphic image multiple times on a format. Send the graphic image to the printer after the format to which it applies.

If a graphic is stored in temporary storage, do not place a graphic field in the format. This will cause an error. Instead, position the graphic image by using the row and column locations in the graphic packet header. Image memory (temporary storage) will accept a graphic packet 1218 rows long with 811 dots per row.

Creating a Graphic Packet

Your graphic packet can contain

- bitmapped fields (for bitmapped images)
- constant text fields
- lines
- boxes

Images using hex representation or run length encoding are bitmapped images. See “Designing Bitmapped Images” to design your bitmapped image.

Once you design your graphic image, you are ready to define a graphic packet. This packet generates the graphic image you use in a format.

Positioning the Graphic Image

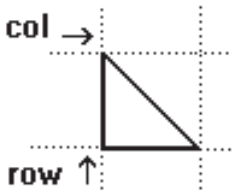
This section explains how to position the graphic image within a graphic packet header, a field of a graphic packet, or within a format.

Within the Graphic Packet Header

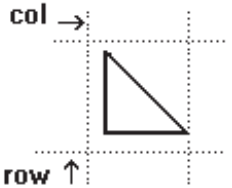
When you are using RAM, the row and column parameters in the graphic header are usually **0,0**, because placement is controlled by the graphic field in your format. This is especially true when designing a compliance label overlay.

When you are using temporary storage, these parameters control the placement of the graphic image on the supply.

The area enclosed within the dotted lines represents the graphic image starting at **0,0** (as defined in the graphic header).



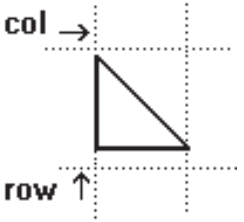
If you want a fixed amount of white space around your graphic image, use something other than 0 for row and/or column.



The area enclosed within the dotted lines represents the graphic image starting at **0,0** with a fixed amount of white space (**10,10**) around the graphic image.

Within the Field

In a bitmap, constant text, line, or box field, the row and column parameters control where an individual field or bitmapped row begins in relation to the coordinates defined in the graphic header.



The bottom of the triangle in this example represents the first field of the graphic packet starting at **10,0**.

Within a Format

When you define the graphic field within your format, the *row* and *column* parameters represent where on the **format** to place the graphic image.

If you are doing a compliance label, these numbers are usually **0,0**, because your compliance label covers the entire supply. See "Placing the Graphic in a Format," for a sample compliance label.

If you are placing a graphic (a logo, for example) within a certain area on your supply, enter the starting position (bottom left corner) of the graphic image.

This label shows the triangle “logo” beginning (the bottom left corner) at **400**, **75** as defined in the graphic field.



Defining the Graphic Header

Every graphic packet must contain a graphic header. This is the first thing you enter. It identifies and provides important measurement and formatting information for the graphic. Bitmap, duplicate, next-bitmap, constant text, line, and box fields follow the graphic header, if they are used.

Syntax

```
{G,graphID,action,device,units,row,col,
mode,"name" }
```

G1. G Graphic Header.

G2. graphID Unique number from **1** to **999** to identify the graphic image.

G3. action Enter **A** to add the graphic to the printer.

G4. device Graphic storage device:

- **F** Flash (saved when the printer is turned off)
- **R** Volatile RAM
- **T** Temporary storageNote:

G5. units Unit of measure. For bitmapped graphics, **G** (dots) is the only valid option.

G6. row Distance between the *bottom* of the graphic image area and the first bitmap line. This is usually **0**, unless you want a fixed amount of white space around the graphic image. See “Positioning the Graphic Image,” for more information.

Printer	Unit of Measure	Row or End Row	Column or End Column
9825/ 9855/ 9860	English Metric 203 dpi Dots	0-1599 0-4061 0-3246	0-399 0-1013 0-810
9855/ 9860	English Metric 300 dpi Dots	0-1199 0-3045 0-3597	0-399 0-1013 0-1197
9855RFMP/ 9855HF	English Metric 203 dpi Dots 300 dpi Dots	0-1299 0-3299 0-2637 0-3897	0-399 0-1013 0-810 0-1197

G7. column Distance between the *left edge* of the graphic image area and the left edge of first bitmap line. This is usually **0**, unless you want a fixed amount of white space around the graphic image. See “Positioning the Graphic Image,” for more information. Use the previous table for values.

G8. mode Imaging mode. Enter **0**.

G9. “name” Graphic name (optional), **0** to **8** characters, enclose within quotation marks.

Example

```
{G,99,A,R,G,0,0,0,"99Wire" ¦
```

Adds a graphic image identified by number 99 to volatile RAM. The graphic uses dot measurement. The image will be placed according to the row and column parameters in the graphic field. The imaging mode is 0 and the image is called 99Wire.

This defines one row of dots, starting at a specific row and column within the graphic image. Each unique row of dots requires a bitmap field. A bitmap field can later be repeated by using a duplicate field.

Syntax `B,row,column,algorithm,"data" ¦`

B1. B Bitmap Field.

B2. row Distance (in dots) from the graphic image's bottom margin to the bitmap line.

Printer	Unit of Measure	Row or End Row	Column or End Column
9825/ 9855/ 9860	English Metric 203 dpi Dots	0-1599 0-4061 0-3246	0-399 0-1013 0-810
9855/ 9860	English Metric 300 dpi Dots	0-1199 0-3045 0-3597	0-399 0-1013 0-1197
9855RFMP/ 9855HF	English Metric 203 dpi Dots 300 dpi Dots	0-1299 0-3299 0-2637 0-3897	0-399 0-1013 0-810 0-1197

B3. column Distance (in dots) from the graphic image's left edge to the bitmap line. Use the previous table for values.

B4. algorithm Coding method for bitmap data:
- **H** Hex Representation
- **R** Run Length Encoding

B5. data Character string made up of hex or run length encoding. Do not put spaces or any other character between the numbers. Range: **0** to **2710**.

Example

```
{B,39,56,H,"3FFFFFF0" ¦
```

Defines a bitmapped graphic field. The image begins 39 dots from the bottom and 56 dots from the left edge of the graphic area. Hex representation is used.

Creating Next-Bitmap Fields

This field uses the previous field's row and column locations. It allows you to use the bitmap or duplicate field data without having to recalculate row and column locations. This field represents one row of dots on the image.

Syntax

```
N,adjdir,adjamt,algorithm,"data" ¦
```

N1. N Next-Bitmap Field.

N2. adjdir Increments or decrements the row count. Inserts the duplicate line after or before the current row.

- **0** Increments (inserts after)
- **1** Decrements (inserts before)

For example:

```
B,50,35,R,"GsSsG" ¦
N,0,1,R,"DpZoD" ¦
```

prints a next-bitmap field on row 51 at column 35.

N3. adjamt Amount of row adjustment in dot rows. Using **0** overwrites the same line. Range: **0** to **999**.

N4. algorithm Coding method for bitmap data:

- **H** Hex Representation
- **R** Run Length Encoding

N5. "data" Character string made up of hex or run length encoding. Do not put spaces or any other character between the hex numbers or run length code letters. Range: **0** to **2710**.

Example

```
B,39,56,H,"3FFFFFF0" ¦
N,0,1,H,"000000E00000" ¦
```

Defines a next-bitmap graphic field beginning on row 40. The row count increments by 1. Hex representation is used.

Creating Duplicate Fields

If a line of data is identical to a previous bitmap or next-bitmap field, the duplicate field allows you to repeat the dot sequence without retyping the data. A duplicate field represents one row of dots on the image.

Note: Duplicate fields are useful when you have a graphic with a lot of repetition.

Syntax

```
D,adjdir,adjamt,count ¦
```

D1. D Duplicate Field.

D2. adjdir Increments or decrements the row count. Inserts the duplicate line after or before the current row.

- **0** Increments (inserts after)
- **1** Decrements (inserts before)

For example:

```
B,50,35,R,"GsSsG" ¦
D,0,20,2¦
```

inserts row 50 again at row 70 and row 90. Rows 70 and 90 do not have to be defined later.

D3. adjamt Amount of row adjustment in dot rows. Range: **0** to **999**. The above example adjusts the duplicate field to image on row 70 and 90 (adding 20 to the current row count).

D4. count Number of times to duplicate the line. Range: **0** to **999**.

Example

```
B,117,24,H,"03FFFFFFFFFFFFFFFFFC" ¦
D,0,1,2 ¦
```

Defines a duplicate field that is imaged after the bitmap line. This field duplicates the preceding bitmap line twice (at row 118 and 119).

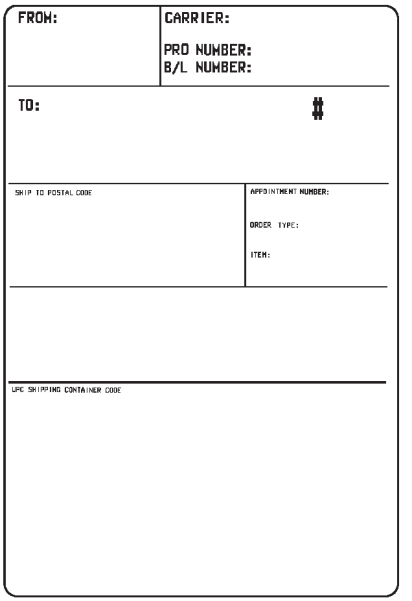
You can use constant text, line, or box fields in a graphic packet to create a compliance label overlay. See Chapter 3, “Defining Fields,” for more information about these fields.

Sample Compliance Graphic Packet

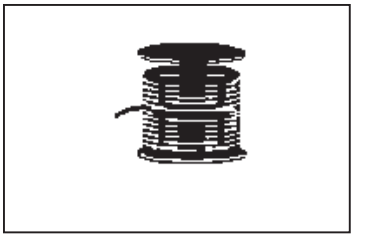
A sample compliance graphic packet is shown below.

```
{G,57,A,R,E,0,0,0,"OVERLAY" ¦
L,V,500,155,90,85,3 ¦
L,V,298,245,90,102,3 ¦
L,V,500,2,0,390,3 ¦
L,V,400,2,0,390,3 ¦
L,V,298,2,0,390,3 ¦
L,V,200,2,0,390,5 ¦
C,560,10,0,2,2,2,B,L,0,0,"FROM:",0 ¦
C,560,160,0,2,2,2,B,L,0,0,"CARRIER:",0 ¦
C,529,160,0,2,2,2,B,L,0,0,"PRO NUMBER:",0 ¦
C,511,160,0,2,2,2,B,L,0,0,"B/L NUMBER:",0 ¦
C,472,10,0,2,2,2,B,L,0,0,"TO:",0 ¦
C,387,10,0,2,1,1,B,L,0,0,"SHIP TO POSTAL CODE",0 ¦
C,391,250,0,2,1,1,B,L,0,0,"APPOINTMENT NUMBER:",0 ¦
C,358,250,0,2,1,1,B,L,0,0,"ORDER TYPE:",0 ¦
C,327,250,0,2,1,1,B,L,0,0,"ITEM:",0 ¦
C,190,8,0,2,1,1,B,L,0,0,"UPC SHIPPING CONTAINER CODE",0 ¦
C,548,6,0,2,1,1,B,L,0,0,"MONARCH MARKING SYSTEMS",0 ¦
C,538,6,0,2,1,1,B,L,0,0,"170 MONARCH LANE",0 ¦
C,528,6,0,2,1,1,B,L,0,0,"P.O. BOX 608",0 ¦
C,518,6,0,2,1,1,B,L,0,0,"DAYTON, OHIO  45401",0 ¦
C,462,313,0,2,4,3,B,L,0,0,"#",0 ¦ }
```

The sample compliance label overlay was created with this packet, using the format provided in “Placing the Graphic in a Format.”



Sample Hex Graphic Packet

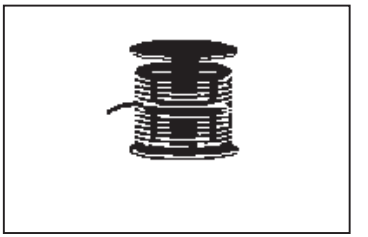


```
{G,99,A,R,G,0,0,0,"99WIRE"¦
B,39,48,H,"3FFFFFF0" ¦
B,40,32,H,"01FFC000000FF8"¦
B,41,32,H,"3E00000000000FC0" ¦
B,42,24,H,"03C0003FFFFFF0000F"¦
B,43,24,H,"7C3FFFFFFFFFFFFE1F0" ¦
B,44,16,H,"0183FFFFFFFFFFFFFFF06" ¦
B,45,16,H,"018FFFFFFFFFFFFFFFFFE" ¦
B,46,16,H,"01FFFFFFFFFFFFFFFFFFE"¦
B,47,16,H,"01FFFFFF80001FFFFFFFE" ¦
B,48,16,H,"01FFFFF0000000007FFFFC" ¦
B,49,24,H,"7F800007FFFF00003FF0" ¦
B,50,24,H,"1FC00007FFFF00001FC0" ¦
D,0,4,4 ¦
B,51,24,H,"1C03FFFFFFFFFFE01C0"¦
D,0,4,4 ¦
B,52,32,H,"3FFFFFFFFFFFFFE1C0" ¦
D,0,4,4 ¦
B,53,24,H,"03FFF0000000007FFE"¦
D,0,4,4 ¦
B,70,0,H,"0400001FC00007FFFF00001FC0" ¦
B,71,0,H,"0600001C03FFFFFFFFFFE01C0" ¦
B,72,0,H,"030000003FFFFFFFFFFFFE1C0" ¦
B,73,0,H,"01000003FFF0000000007FFE" ¦
B,74,8,H,"FC001C03FFFFFFFFFFE00C0" ¦
B,75,8,H,"FE00003FFFFFFFFFFFFE0C0" ¦
B,76,8,H,"1FF803FFF0000000007FFE" ¦
B,77,8,H,"0FFFCFFC00000000000001C0" ¦
B,78,16,H,"FFDF000FFFFFFFFF8003C0" ¦
B,79,16,H,"7FFFC00007FFFF00001FC0" ¦
B,80,24,H,"1C03FFFFFFFFFFE01C0" ¦
D,0,4,4 ¦
B,81,32,H,"3FFFFFFFFFFFFFE1C0" ¦
D,0,4,4 ¦
B,82,24,H,"03FFF0000000007FFE" ¦
D,0,4,3 ¦
B,83,24,H,"1FC00007FFFF00001FC0" ¦
D,0,4,3 ¦
B,98,24,H,"03FFFFFFFFFFFFFF0" ¦
```

```
B,99,24,H,"07FFFFFFFFFFFFFC" ¦
B,100,24,H,"1FF9FFFFFFFFFFFF" ¦
B,101,24,H,"3FFE0007FFFF8000FF80" ¦
B,102,24,H,"391E0027FFFF803FFFC0" ¦
B,103,24,H,"1C7FFFFFFFFFFFFFFC0" ¦
B,104,24,H,"1FC1FFFFFFFFFF1FC0" ¦
B,105,24,H,"0FFDFFFFFFFFFE0FF" ¦
B,106,24,H,"FFFFFFFFFFFFFF8" ¦
B,107,32,H,"3FFFFFFFFFFFFE0" ¦
B,108,32,H,"03FFFFFFFFFF"¦
B,109,48,H,"07FFFF80" ¦
D,0,1,2 ¦
B,111,48,H,"FFFFFFFF" ¦
B,112,32,H,"FFFF00000000FFE0" ¦
B,113,24,H,"078000FFFFFFFF001F" ¦
B,114,24,H,"78FFFFFFFFFFFFFE060" ¦
B,115,16,H,"0187FFFFFFFFFFFFFC18" ¦
B,116,16,H,"027FFFFFFFFFFFFFFFF2" ¦
B,117,16,H,"03FFFFFFFFFFFFFFFFFC" ¦
D,0,1,2 ¦
B,120,16,H,"01FFFFFFFFFFFFFFFFF8"¦
B,121,24,H,"FEFFFFFFFFFFFFFFFE0"¦
B,122,24,H,"07FFFFFFFFFFFFFC" ¦
B,123,32,H,"FFFFFFFFFFFFC0"  ¦
B,124,32,H,"01FFFFFFFFF8" ¦ }
```

Sample Run Length Graphic Packet

```
{G,99,A,R,G,0,0,0,"99WIRE" ¦
B,39,50,R,"Z" ¦
B,40,39,R,"KzI"¦
B,41,34,R,"EzsF" ¦
B,42,30,R,"DpZoD" ¦
B,43,25,R,"EdZZEdE" ¦
B,44,23,R,"BeZZMeB" ¦
B,45,23,R,"BcZZW" ¦
B,46,23,R,"ZZZA" ¦
B,47,23,R,"ZDsZE" ¦
B,48,24,"TzkU" ¦
B,49,25,"HtRqJ" ¦
B,50,27,"GsSsG" ¦
D,0,4,4 ¦
B,51,27,"ChZWgC" ¦
D,0,4,4 ¦
B,52,34,R,"ZZEdC" ¦
D,0,4,4 ¦
B,53,30,R,"NzkN" ¦
D,0,4,4 ¦
B,70,5,R,"AuGsSsG" ¦
B,71,5,R,"BtChZWgC" ¦
B,72,6,R,"DxZZEdC" ¦
B,73,7,R,"CtNzkN" ¦
B,74,8,R,"FmChZWhC" ¦
B,75,8,R,"GsZZEdC" ¦
B,76,11,R,"JiNzkN" ¦
B,77,12,R,"NbJzzeC" ¦
B,78,16,R,"JaElZKmD" ¦
B,79,17,R,"QsSsG"¦
B,80,27,R,"ChZWgC" ¦
D,0,4,4 ¦
B,81,34,R,"ZZEdC" ¦
D,0,4,4 ¦
B,82,30,R,"NzkN" ¦
D,0,4,4 ¦
B,83,27,R,"GsSsG" ¦
D,0,4,4 ¦
B,98,30,R,"ZZJ" ¦
B,99,29,R,"ZZM" ¦
B,100,27,R,"JbZZE" ¦
```



```
B,101,26,R,"MnToI" ¦
B,102,26,R,"CbHnTiP" ¦
B,103,27,R,"CcZZC" ¦
B,104,27,R,"GeZWcG" ¦
B,105,28,R,"JaZReH" ¦
B,106,32,R,"ZZI" ¦
B,107,34,R,"ZZE" ¦
B,108,38,R,"ZQ"¦
B,109,53,R,"T" ¦
D,0,1,2 ¦
B,111,48,R,"ZF" ¦
B,112,33,R,"PzfK" ¦
B,113,29,R,"CpZBoE" ¦
B,114,25,R,"DcZZGfB" ¦
B,115,23,R,"BdZZMeB" ¦
B,116,22,R,"AbZZVbA" ¦
B,117,22,R,"ZZZB" ¦
D,0,1,2¦
B,120,23,R,"ZZZ" ¦
B,121,25,R,"ZZV" ¦
B,122,29,R,"ZZM" ¦
B,123,32,R,"ZZF" ¦
B,124,39,R,"ZT" ¦ }
```

Placing the Graphic in a Format

To include a graphic within a format:

1. Design the graphic image as shown in “Designing Bitmapped Images.”
2. If you are using RAM, place a graphic field in the format file to reference the graphic. See the following section, “Defining the Graphic Field,” for more information.

Note: If you are using temporary storage, you do not need a graphic field in your format to reference the graphic image.

3. Download all the necessary packets (check digit, format, etc.).
4. Send the graphic file to the printer, if you have not already done so. See “Creating a Graphic Packet” for more information.

Defining the Graphic Field

The graphic field in a format references the graphic image by the graphID in the graphic header. **This field is required only if the graphic will be stored in RAM.**

Syntax `G,graphID,row,col,mode,rotation ¦`

G1. G Graphic Field.

G2. graphID Unique number from **1** to **999** to identify the graphic image.

G3. row Distance between the *bottom* of the print area on the supply to the bottom of the graphic image. Measured in selected units.

Printer	Unit of Measure	Row or End Row	Column or End Column
9825/ 9855/ 9860	English Metric 203 dpi Dots	0-1599 0-4061 0-3246	0-399 0-1013 0-810
9855/ 9860	English Metric 300 dpi Dots	0-1199 0-3045 0-3597	0-399 0-1013 0-1197
9855RFMP/ 9855HF	English Metric 203 dpi Dots 300 dpi Dots	0-1299 0-3299 0-2637 0-3897	0-399 0-1013 0-810 0-1197

The row specified in the constant text, bitmap, line, or box field is added to the *row* value above to determine the actual position in the format.

G4. column Distance between the *left edge* of the print area on the supply and the left edge of the graphic. Measured in selected units. Use the previous table for values. The column specified in the constant text, bitmap, line, or box field is added to the *col* value above to determine the actual position in the format.

G5. mode Imaging mode. Enter **0**.

G6. rotation The orientation of the graphic on the supply. Enter **0**.

Example

```
G,57,0,0,0,0 !
```

Defines a graphic field that is identified by the number 57. The image begins at 0,0. The imaging mode is 0 and there is no rotation.

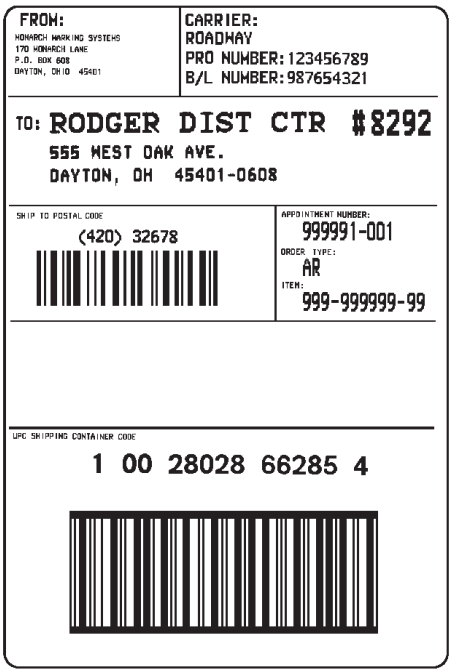
Sample Compliance Label

This sample format packet uses the graphic packet in “Creating a Graphic Packet.”

```
{F,1,A,R,E,600,400,"RDCI" ¦
G,57,0,0,0,0 ¦
T,1,15,V,529,252,0,2,2,2,B,L,0,0,0 ¦
T,2,15,V,511,252,0,2,2,2,B,L,0,0,0 ¦
B,3,13,V,311,28,8,4,50,8,L,0 ¦
B,4,14,V,17,60,50,5,110,8,L,0 ¦
T,5,30,V,161,080,0,3,1,1,B,L,0,0,0 ¦
T,6,15,V,467,40,4,1,2,2,B,L,0,0,0 ¦
T,7,10,V,462,330,6,2,4,3,B,L,0,0,0 ¦
T,8,20,V,545,160,0,2,2,2,B,L,0,0,0 ¦
T,9,30,V,446,40,4,2,2,2,B,L,0,0,0 ¦
T,10,30,V,426,40,4,2,2,2,B,L,0,0,0 ¦
T,11,30,V,406,40,4,2,2,2,B,L,0,0,0 ¦
T,12,20,V,368,270,0,2,3,2,B,L,0,0,0 ¦
T,13,5,V,335,270,0,2,3,2,B,L,0,0,0 ¦
T,14,15,V,304,270,0,2,3,2,B,L,0,0,0 ¦
T,15,15,V,366,65,0,2,2,2,B,L,0,0,0 ¦
R,1,"(420)" ¦ }
```

Sample Batch Packet

```
{B,1,N,1 ¦
1,"123456789" ¦
2,"987654321" ¦
3,"42032678" ¦
4,"10028028662854" ¦
5,"1 00 28028 66285 4" ¦
6,"RODGER DIST CTR" ¦
7,"8292" ¦
8,"BROADWAY" ¦
9,"555 WEST OAK AVE." ¦
10,"DAYTON, OH 45401-0608" ¦
11," " ¦
12,”999991-001" ¦
13,"AR" ¦
14,"999-999999-99" ¦
15,"32678" ¦ }
```



Sample Bitmap Graphic Image

The following format shows the graphic packets (hex and run length) in a sample format.

```
{F,2,A,R,E,400,400,"FMT2" ¦
G,99,227,35,0,0 ¦
Q,240,15,300,125,10," " ¦
T,1,5,V,285,137,0,10,2,2,B,L,0,0,0 ¦
T,2,5,V,255,137,0,10,2,2,B,L,0,0,0 ¦
T,3,15,V,180,25,0,10,1,2,B,L,0,0,0 ¦
T,4,15,V,121,35,0,1,3,1,B,L,0,0,0 ¦
L,S,94,15,94,235,10,"" ¦
B,5,12,F,50,65,1,2,40,1,L,0 ¦ }
```

Sample Batch Packet

```
{B,2,N,1 ¦
1,"Pat’s" ¦
2,"Parts" ¦
3,"3/8 inch Wire" ¦
4,"3.55/8 Pack" ¦
5,"345911871209" ¦ }
```



PRINTING

6

This chapter describes how to

- download files to the printer
- define the batch header, batch control, and batch data files
- create DOS batch files.

This chapter also lists some special printing considerations.

Turn on the printer and make sure it is ready to receive data before you download. See your host's documentation, system administrator, or "Downloading Methods" for information on ways to download.

When downloading, send your packets in this order:

1. Memory configuration packet (M)
2. Configuration packets (A-G)
3. Any of the following:

   * Check digit packets (see Chapter 4)

   * Format packets (see Chapter 3)

   * Graphic packets (see Chapter 5)

4. Batch data (see "Defining the Batch Header")

Downloading Files

To download from a PC:

1. Check that the PC and the printer are connected.
2. Check that communications have been established between the PC and the printer.
3. Send the communication settings packet to select the printer's communication settings. See "Defining the Communication Settings Packet" in Chapter 2 for more information (only used for serial communication). If you change the printer's communication settings, make sure they match those at the host before sending any packets to the printer.

4. Type this command at the DOS prompt:

`COPY LABEL1.FMT COM1` Transmits a file called "LABEL1.FMT" to COM1.

`COPY LABEL1.BCH COM1` Transmits a batch called "LABEL1.BCH" to COM1.

If you use the COPY command to download your formats, set flow control to DTR (not XON/XOFF). Also, do not use the MS-DOS prompt from inside Windows, because you will get a framing error.

Refer to the *Operator's Handbook* or keyboard's *Operating Instructions* for offline data entry and more printing information.

Defining the Batch Header

Batch data is the actual information printed on the supply. Batch data fills in the format's text, bar code, and non-printable text fields.

A batch packet contains the following three parts:

batch header identifies the format and how many labels to print.

batch control defines the print job.

batch data (optional) defines the actual information printed on the label.

A batch header begins the file. It tells which format the batch uses and how many labels to print. To record batch data, make a copy of the worksheet in Appendix D, "Format Design Tools."

Syntax `{B,format#,N/U,quantity ¦`

B1. B Batch Header.

B2. format# Format number (**1** to **999**) to use.

B3. N/U Controls how image is generated.

- **N** New (default). Erase image and re-image all fields using online data. Any missing fields will be blank.
- **U** Update last image with one or more fields. All other fields remain the same as the last queued batch.

B4. quantity Quantity to print (**0** to **32000)**. Using **0** pre-images the field to reduce the imaging time for labels. See “Batch Quantity Zero Method” for more information.

Example `{B,1,N,1 ¦`

Defines a batch header that uses format #1 and reimages all fields using the online data. One label is printed with this batch.

Defining the Batch Control Field

The batch header must precede this field. The batch control field defines the print job and **applies only to the batch that immediately follows**.

Syntax
```
E,feed_mode,batch_sep,print_mult,multi_part,
cut_type,cut_mult,ver_mode,cable_det ¦
```

E1. E Batch Control Field.

E2. feed_mode Feed Mode. Options:

- **0** Continuous Feed (default)
- **1** On-Demand

E3. batch_sep Batch Separator (striped label in between batches). Options:

- **0** Does not print a separator (default)
- **1** Prints a separator
- **2** Double-length separator- prints 2 tags (9855/9860)

Note: Do not use batch separators with continuous (non-indexed) supply or RFID supply. If using a stacker, the batch separator is always 3.66 inches long.

E4. print_mult Number of tags (**1** to **999**) with the same image. 0 is the default.

E5. multi_part Number of identical parts on one tag (**1** to **5**). 0 is the default.

E6. cut_type Enables or disables the knife. Not all the printers support a knife. See the following chart for more information. Options:

- **0** Does not cut (default)
- **1** Cuts before, during, and after last tag - printed tag(s) left between printhead & knife.
- **2** Cuts in strips, not each tag - printed tag(s) left between printhead & knife.
- **3** Cuts before, during, and after last tag - no printed tags left between printhead & knife.
- **4** Does not cut before first tag, cuts each tag and after the last tag - printed tag(s) left between printhead & knife.
- **5** Cuts in strips, not each tag - no printed tags left between printhead & knife.

Description of cut mode operation				Recommended Settings for optimal performance with: Straight Edge Tags		Edge Aperture Tags	
Cut Mode	**Cut Before first tag in Batch?**	**Cut Between Tags?**	**Cut After Batch?**	**Extended backfeed**	**Overstrike w/verifier**	**Extended backfeed**	**Overstrike w/verifier**
0	No	No	No	Yes	Yes	No	No
1	Yes	Yes	Yes*	Yes	Yes	Yes	Yes
2	Yes	No (Feeds strips)	Yes*	Yes	Yes	No	No
3	Yes	Yes	Yes**	No	Yes	Yes	Yes
4	No	Yes	Yes*	Yes	Yes	No	Yes
5	Yes	No (Feeds strips)	Yes**	Yes	Yes	No	No

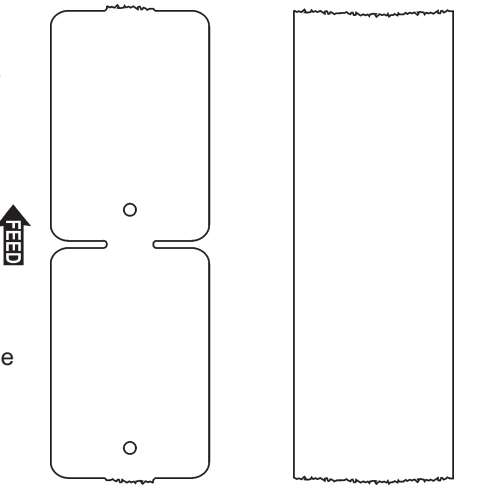
* The last tag in the batch is queued to be cut once it reaches the knife; however, there may be printed tags left between the printhead and the knife. The user must press **FEED/CUT** or send another batch to feed the last tag out far enough to be cut. Enabling extended backfeed eliminates printed tags between the knife and printhead.

** The printer feeds the last tag in the batch out far enough to be cut. No user intervention is required to cut the last tag.

Note: The 9860 printer automatically backfeeds when necessary. See "Defining the Backfeed Control Packet" in Chapter 2 for more information. Do not use extended backfeed when sensing on attacher-hole supplies.
Using "overstrike/continue" as the Error Action minimizes the number of RFID tags left between the printhead and knife. To use the least amount of RFID tags, set overstrike to five. Refer to the printer's *Operator's Handbook* for more information.

E7. cut_mult Number of tags to print before cutting. A cut multiple of one cuts after each tag. Range: **0** to **32,000**. 0 is the default.

The cut multiple is a multiple of the print quantity. If the cut multiple is three and the print quantity is 16, then five sets of three tags and one set of one tag is produced.



Note: The last tag in the batch is always cut, regardless of the multiple.

E8. ver_mode Verifier Mode. Enables or disables the verifier. For more information about enabling the verifier, refer to the *Verifier's Operating Instructions*. Not all the printers support a verifier. Options:

- **0** Disable verifier - not using a verifier (default)
- **1** Enable verifier

E9. cable_det Verifier cable detect. The printer can be set to detect when a verifier's cable is disconnected. For more information about connecting the verifier's cables, refer to the *Verifier's Operating Instructions*. Options:

- **0** The printer does not detect when a cable is disconnected (default)
- **1** I/O cable is disconnected
- **2** I/O and/or data cables are disconnected

Example

```
E,0,1,4,2,1,4,1,2 ¦
```

Defines a batch control field. Continuous feed mode is used and a separator prints between batches. Four tags have the same image and there are two identical parts on one tag. The knife cuts after every four tags. A verifier is enabled and the printer detects when either the I/O or data cables are disconnected.

Defining Batch Data Fields

Batch data fields should be sent in field number order. Use continuation fields for large amounts of data. If you are using **N** (New) in the batch header, you must list all fields with your data in sequence. If you are using **U**, you need to list only those fields and data that changes from the last printed batch.

Syntax

```
field#,"data string" ¦
C,"continuation" ¦
```

field# Identifies the text, bar code, or non-printable text field in which to insert the following data. Range: **1** to **999**.

"data string" Provides the actual information to appear in fields. Enclose in quotation marks. Length: **0** to **2710** characters.

C Identifies information to be appended to the data string. This parameter is optional.

"continuation" Provides the actual information to be added to the batch packet. Enclose in quotation marks. Use this option to break up longer fields. Length: **0** to **2710** characters. This parameter is optional.

Example

```
1,"Size 12" ¦
2,"" ¦
3,"Blue" ¦
C,"and this would be appended." ¦
```

Defines a batch data field. “Size 12" prints in field #1, a blank line appears in field #2, ”Blue and this would be appended" prints in field #3.

Using Expanded EPC Gen2 RFID Data

With version 5.0 or greater software, we support Expanded C1Gen2 RFID data, which is composed of five different fields:

- EPC Data (64 or 96-bits)
- User Memory
- Lock Code
- Access Password
- Kill Password

The printer also accepts EPC data following the guidelines in the EPCglobal *Tag Data Standards Specification,* which conforms to the *EPC Radio-Frequency Identity Protocols Class 1 Generation 2 UHF RFID Protocol for Communications at 860-960MHz Standards* (RFID Air Interface protocol). Refer to the EPC Specification to create valid EPC data.

Many different RFID supplies (tags) are available and the amount of programmable user memory varies with the chip embedded in the tag. Depending on your tag type, all memory fields may not be available. Refer to the *RFID Setup Guide & Supply Chart* for details about the available user memory for each chip.

Note: Incrementing an Expanded C1Gen2 RFID Data Field is not supported.

Use the access password to control when new data can be written to a field. The kill password sets a tag up to be inoperable. The lock code contains the locking method.

One of the four locking methods can be selected for each memory field (EPC, access password, and kill password). Depending on the locking method specified, the memory field may or may not be readable or writable. There are four locking methods.

Value	EPC Lock Name	Description
0	No lock	The selected memory fields are readable and writable. The tag can be programmed multiple times.
1	Permalock	Permanently locked in a readable and writable state. The tag can be programmed multiple times.
2	Password lock	Requires access password to rewrite the selected memory fields. The tag can be programmed multiple times with the password.
3	Permalock and Password lock	Never rewritable, but always readable. The tag can never be rewritten, once locked.

Note: The EPC field is always readable, no matter what locking method is assigned.

The following tables describe the locking method for each memory field.

EPC Memory	Description
0	EPC is readable and writable.
1	EPC is permanently writable (can never be locked).
2	EPC is only writable with password, but is readable.
3	EPC is never rewritable, but is readable.

User Memory	Description
0	User memory is readable and writable.
1	User memory is permanently writable (can never be locked), but is readable.
2	User memory is only writable with password, but is readable.
3	User memory is never rewritable, but is readable.

Access Password	Description
0	Access password is readable and writable.
1	Access password is permanently writable (can never be locked).
2	Access password is never readable.
3	Access password is never readable or rewritable.

Kill Password	Description
0	Kill password is readable and writable.
1	Kill password is permanently writable (never locked), but is readable.
2	Kill password is only writable with password.
3	Kill password is never readable or rewritable.

To use the Expanded C1Gen2 data, you need to modify the RFID Field's batch data.

Syntax

```
field#,"EPC_data~028" ¦
C,"User_Mem~028" ¦
C,"~028" ¦
C,"Acs_Pwd~028" ¦
C,"Kill_Pwd~028" ¦
C,"Lock_Code" ¦
```

field# Identifies the RFID Data Field number for the following data.
Range: **1** to **999**.

"EPC_data~028" EPC data. Enclose in quotation marks. To create EPC data, follow the guidelines in the *EPC Global Generation 1 Tag Data Standards Specification*. The data **must** be in the same format (ASCII Hex, ASCII, etc.) specified in the RFID Data Field (*data_type*).
The printer can program 96-bits of data (24 ASCII Hex characters).
The data must end with the ASCII field separator (decimal 028).

"User_Mem~028" User Memory. Enclose in quotation marks. The amount of programmable user memory varies with the tag types. Refer to the *RFID Setup Guide & Supply Chart* for details about the available user memory for each chip.
The printer (version 6.2 or greater) can program up to 512-bits of data (128 ASCII Hex characters). The data must be ASCII Hex characters and end with the ASCII field separator (decimal 028).

Note: Do not enter more characters than the user memory space available. For example, if your tag has 96-bit user memory available, you cannot enter more than 96-bits of data for this field. However, you can enter less than 96-bit without an error.

"~028" Identifies information to be appended. Reserved for future use. Only include the field separator (decimal 028) in this field.

"Acs_Pwd~028" Access Password. This must be **8** ASCII Hex characters. No password is assigned if this field is left blank. The data must end with the ASCII field separator (decimal 028).

"Kill_Pwd~028" Kill Password. This must be **8** ASCII Hex characters. No password is assigned if this field is left blank. The data must end with the ASCII field separator (decimal 028).

"Lock_Code~028" Five-digit locking method for each field in this order:
EPC Data, User memory, Reserved, Access password, and Kill password.
Use 0 for the reserved field. Locking options:

- **0** No lock (default)
- **1** Permalock
- **2** Password lock
- **3** Permalock & password lock

Note: Use only one locking method per field. The printer is not capable of unlocking a field. Depending on the locking method used for each field, the EPC data *may* be programmable by sending the access password with the batch data.

Example

```
{F,2,A,R,E,400,400,"PERMLOCK" ¦
X,1,100,0 ¦ }
{B,2,N,1 ¦
1,"313233343536373831323334~028" ¦
C,"ABCDEF~028" ¦
C,"~028" ¦
C,"73737373~028" ¦
C,"CAD01234~028" ¦
C,"11001" ¦ }
```

The EPC data is 313233343536373831323334, the user memory data is ABCDEF, the access password is 73737373, and the kill password is CAD01234. Selects permalock (1) as the locking method for the EPC, user memory, and kill field. Selects no lock (0) for the access password field. The EPC, user memory, and kill fields are **permanently** readable/writable.

Using Special Characters in Batch Data

There are two ways to specify special characters in batch data:

Place a tilde (~) before each character

Use a tilde with the decimal ASCII equivalent

For example, you can use “” or ~034 to print the “ character in your batch data; otherwise, the tilde characters are ignored. You can also use ~XXX where XXX is the decimal equivalent of an unprintable character.

Sample Batch Data with Special Characters

{B,1,N,1 ¦	Decimal Character	What Prints
1,"123~034456789" ¦	~034 is “	123"456789
2,"~094983~’126LG4451" ¦	~094 is ^ ~126 is ~	^983~’LG4451

Merged or Sub-Fields

If a field is completely filled by data copied from other fields, use quotation marks without spaces between them for the *"data string"* parameter.

Incrementing Fields

In incrementing fields, the first number in the sequence must contain the same number of digits as the highest number to be counted. For example, to increment the numbers in a field from **1** to **999**, enter the starting number in the batch as **001**.

Special Printing Considerations

Keep in mind the following special printing considerations when using a 9855 or 9860 printer.

9855 Printer

Print Speed	Printing	Printhead Density	Knife	Peel Mode	Verifier
2.5/4.0/6.0 ips	direct transfer	203/300 dpi	supported	supported	supported
8.0 ips	direct transfer	203/300 dpi	not supported	supported	supported
10.0 ips	direct transfer	203 dpi only	not supported	not supported	supported
12.0 ips	direct transfer	203 dpi only	not supported	not supported	supported

* The minimum label feed length is 0.75 inches using 8, 10, or 12 ips printing. 94x5 emulation is not supported using 300 dpi. The maximum supply and image length with the optional 300 dpi printhead is 12.0 inches (305 mm). The recommended print speed using linerless supplies is 2.5 or 4.0 ips. Contact your Monarch Representative for supply requirements in high temperature and high humidity environments.

9855 RFID Printer

The RFID printer pauses while programming the RFID tag.

9860 Printer

Print Speed	Printing	Printhead Density	Knife	Verifier
2.5/4.0/6.0 ips	direct transfer	203/300 dpi	supported	supported
8.0 ips*	direct transfer	203/300 dpi	supported	supported

* The 9860 printer allows cutting 1.2 inch feed length tags at 8.0 ips; however optimal cut quality may not be achieved.

Serial Bar Code Printing Information

Keep in mind the following serial bar code printing information when using a 9855 or 9860 printer.

Print Speed	Printhead Density	Minimum Bar Code Narrow Element
2.5 ips	203/300 dpi	less than 3 dots
4.0 ips	203 dpi	3 dots
6.0/8.0/10.0 ips	203 dpi	4 dots or more

Downloading Methods

You can download the format and batch data using one of three methods: sequential, batch, and batch quantity zero.

Sequential Method

Using the sequential method, you send all your format and batch data at one time. Use this method when your application does not require operator intervention to input data. All data is sent down at one time, and the printer then images each field. As soon as the last field is imaged, your labels begin to print.

Example

```
{Format}
{Batch Packet}
```

Batch Method

This is similar to the sequential method, but it is used when you want to send multiple batches. All data for the first batch is sent at one time, and the printer then images each field. As soon as the last field for the first batch is imaged, labels begin to print. This process is repeated for each subsequent batch.

Example

```
{Format}
{Batch Packet}
{Batch Packet}
```

Batch Quantity Zero Method

You may use the batch quantity zero method when your application requires operator intervention to enter data. While the operator is entering data, the previous field is sent with a batch quantity of zero. The printer images the field, but does not print it. After the operator enters the data for the last field, the batch quantity can be specified. The last remaining field is imaged, and the label prints almost immediately.

To use the batch quantity zero method:

1. Send the format and a batch header in one file. The first time you send the batch header, use the parameter **N** (new batch), and the parameter **0** for (zero quantity). This ensures the label is properly positioned.

   The printer images constant text, line, and box fields, but does not print them.

2. Input data for each field, and send it with a batch header using the parameter **U** (batch update) and a quantity of zero. When the printer receives the data, it immediately images the field, but does not print it.

   At this time, the printer is imaging all associated fields, including fields that copy from other fields.

3. Repeat step 2 for each field except the last one.

4. For the last field, input data and send a batch header with the quantity of labels you want printed. When the printer receives input for the last field, it immediately prints the labels. See “Reducing Imaging Time” in Chapter 9 for an example using the batch quantity zero method.

Modifying Formats

The optional entry method is a quick way to modify your format fields, check digit fields and configuration packets.

Optional Entry Method

This method enables you to reset only the parameters you want to change. Commas act as placeholders for unchanged parameters. The optional entry method reduces file size and increases the speed at which files are sent to the printer.

Creating DOS Batch Files for Downloading

If you are downloading from an MS-DOS system, you can create batch files to set communication values and download formats. It is a good idea to create a subdirectory to hold your format files.

Here is a DOS batch file that sets a serial port, changes to a subdirectory, and downloads a check digit file, format file, and batch data file.

```
MODE COM1: 9600,N,8,1,P
CD\PAXAR
COPY LABEL1.CDS COM1
COPY LABEL1.FMT COM1
COPY LABEL1.BCH COM1
```

Refer to your DOS manual for more information on creating batch files.

STATUS POLLING

7

This chapter explains how to use status polling.

There are two types of Status Polling:

Inquiry Request—information about the readiness of the printer.

Job Request—information about the current (or last received) job downloaded to the printer.

Inquiry Request (ENQ)

An ENQ character acts as a request for printer status information. You can send an ENQ in front of, in the middle of, or immediately following any packet downloaded to the printer. An ENQ is a command that can be executed as part of a packet or sent on its own (using a communications program). An ENQ is processed immediately. The ENQ character is user defined.

The ENQ character does not appear as a visible character; however, we are representing the ENQ character as ENQ .

Inquiry Response

Printer status is returned to the host in a 3-byte (3-character) sequence. The first byte is the non-printable user-defined ENQ character, which is not visible on the response. The second and third bytes are printer status codes. See the ENQ Reference Tables for the meaning of bytes 2 and 3.

Example: ENQ AB

The status codes (A and B in this case) are ASCII equivalents to the hexadecimal bits that represent the various types of status responses. This response indicates that the printer is online (Character A) and that there is a stock fault (Character B).

Example: ENQ ??

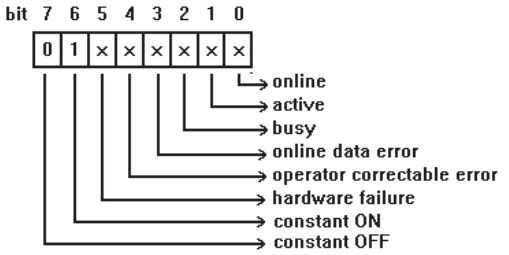
Indicates that this is the first ENQ response since the printer was turned on. Send another ENQ immediately to receive the printer's status.

Example: ENQ @@

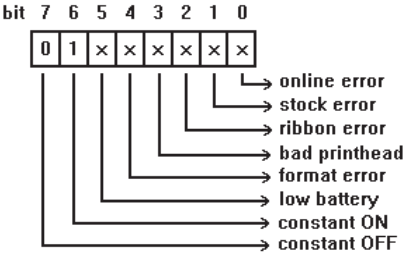
Indicates the printer is offline.

The following graphics can be used as a quick reference for the Status of Byte #2 and Byte #3. Byte #1 is the non-printable user-defined ENQ character.

Status Byte #2



Status Byte #3



ENQ Reference Table - Byte #2

Char	Const. OFF	Const. ON	Comp. Failure	Corr. Error	Online Data Error	Busy	Active	Online
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
@	0	1	0	0	0	0	0	0
A	0	1	0	0	0	0	0	1
B	0	1	0	0	0	0	1	0
C	0	1	0	0	0	0	1	1
D	0	1	0	0	0	1	0	0
E	0	1	0	0	0	1	0	1
F	0	1	0	0	0	1	1	0
G	0	1	0	0	0	1	1	1
H	0	1	0	0	1	0	0	0
I	0	1	0	0	1	0	0	1
J	0	1	0	0	1	0	1	0
K	0	1	0	0	1	0	1	1
L	0	1	0	0	1	1	0	0
M	0	1	0	0	1	1	0	1
N	0	1	0	0	1	1	1	0
O	0	1	0	0	1	1	1	1
P	0	1	0	1	0	0	0	0
Q	0	1	0	1	0	0	0	1
R	0	1	0	1	0	0	1	0
S	0	1	0	1	0	0	1	1
T	0	1	0	1	0	1	0	0
U	0	1	0	1	0	1	0	1
V	0	1	0	1	0	1	1	0
W	0	1	0	1	0	1	1	1
X	0	1	0	1	1	0	0	0
Y	0	1	0	1	1	0	0	1
Z	0	1	0	1	1	0	1	0
[	0	1	0	1	1	0	1	1
\	0	1	0	1	1	1	0	0
]	0	1	0	1	1	1	0	1
^	0	1	0	1	1	1	1	0
_	0	1	0	1	1	1	1	1
`	0	1	1	0	0	0	0	0

Note: A “1" indicates the bit is turned on. A ”0" indicates the bit is off.

ENQ Reference Table - Byte #2 (continued)

Char	Const. OFF	Const. ON	Comp. Failure	Corr. Error	Online Data Error	Busy	Active	Online
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
a	0	1	1	0	0	0	0	1
b	0	1	1	0	0	0	1	0
c	0	1	1	0	0	0	1	1
d	0	1	1	0	0	1	0	0
e	0	1	1	0	0	1	0	1
f	0	1	1	0	0	1	1	0
g	0	1	1	0	0	1	1	1
h	0	1	1	0	1	0	0	0
i	0	1	1	0	1	0	0	1
j	0	1	1	0	1	0	1	0
k	0	1	1	0	1	0	1	1
l	0	1	1	0	1	1	0	0
m	0	1	1	0	1	1	0	1
n	0	1	1	0	1	1	1	0
o	0	1	1	0	1	1	1	1
p	0	1	1	1	0	0	0	0
q	0	1	1	1	0	0	0	1
r	0	1	1	1	0	0	1	0
s	0	1	1	1	0	0	1	1
t	0	1	1	1	0	1	0	0
u	0	1	1	1	0	1	0	1
v	0	1	1	1	0	1	1	0
w	0	1	1	1	0	1	1	1
x	0	1	1	1	1	0	0	0
y	0	1	1	1	1	0	0	1
z	0	1	1	1	1	0	1	0
{	0	1	1	1	1	0	1	1
|	0	1	1	1	1	1	0	0
}	0	1	1	1	1	1	0	1
~	0	1	1	1	1	1	1	0
Dec 127	0	1	1	1	1	1	1	1

Note: A “1" indicates the bit is turned on. A ”0" indicates the bit is off.

ENQ Reference Table - Byte #3

Char	Const. OFF	Const. ON	Low Battery	Format Error	Waiting to Dispense Label	Ribbon Fault	Stock Fault	Online Error
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
@	0	1	0	0	0	0	0	0
A	0	1	0	0	0	0	0	1
B	0	1	0	0	0	0	1	0
C	0	1	0	0	0	0	1	1
D	0	1	0	0	0	1	0	0
E	0	1	0	0	0	1	0	1
F	0	1	0	0	0	1	1	0
G	0	1	0	0	0	1	1	1
H	0	1	0	0	1	0	0	0
I	0	1	0	0	1	0	0	1
J	0	1	0	0	1	0	1	0
K	0	1	0	0	1	0	1	1
L	0	1	0	0	1	1	0	0
M	0	1	0	1	1	0	0	1
N	0	1	0	0	1	1	1	0
O	0	1	0	0	1	1	1	1
P	0	1	0	1	0	0	0	0
Q	0	1	0	1	0	0	0	1
R	0	1	0	1	0	0	1	0
S	0	1	0	1	0	0	1	1
T	0	1	0	1	0	1	0	0
U	0	1	0	1	0	1	0	1
V	0	1	0	1	0	1	1	0
W	0	1	0	1	0	1	1	1
X	0	1	0	1	1	0	0	0
Y	0	1	0	1	1	0	0	1
Z	0	1	0	1	1	0	1	0
[	0	1	0	1	1	0	1	1
\	0	1	0	1	1	1	0	0
]	0	1	0	1	1	1	0	1
^	0	1	0	1	1	1	1	0
_	0	1	0	1	1	1	1	1
`	0	1	1	0	0	0	0	0

Note: A “1" indicates the bit is turned on. A ”0" indicates the bit is off.

ENQ Reference Table - Byte #3 (continued)

Char	Const. OFF	Const. ON	Low Battery	Format Error	Waiting to Dispense Label	Ribbon Fault	Stock Fault	Online Error
	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
a	0	1	1	0	0	0	0	1
b	0	1	1	0	0	0	1	0
c	0	1	1	0	0	0	1	1
d	0	1	1	0	0	1	0	0
e	0	1	1	0	0	1	0	1
f	0	1	1	0	0	1	1	0
g	0	1	1	0	0	1	1	1
h	0	1	1	0	1	0	0	0
i	0	1	1	0	1	0	0	1
j	0	1	1	0	1	0	1	0
k	0	1	1	0	1	0	1	1
l	0	1	1	0	1	1	0	0
m	0	1	1	0	1	1	0	1
n	0	1	1	0	1	1	1	0
o	0	1	1	0	1	1	1	1
p	0	1	1	1	0	0	0	0
q	0	1	1	1	0	0	0	1
r	0	1	1	1	0	0	1	0
s	0	1	1	1	0	0	1	1
t	0	1	1	1	0	1	0	0
u	0	1	1	1	0	1	0	1
v	0	1	1	1	0	1	1	0
w	0	1	1	1	0	1	1	1
x	0	1	1	1	1	0	0	0
y	0	1	1	1	1	0	0	1
z	0	1	1	1	1	0	1	0
{	0	1	1	1	1	0	1	1
|	0	1	1	1	1	1	0	0
}	0	1	1	1	1	1	0	1
~	0	1	1	1	1	1	1	0
Dec 127	0	1	1	1	1	1	1	1

Note: A “1" indicates the bit is turned on. A ”0" indicates the bit is off.

Job Request

A Job Request returns status information about the most recently processed print job. You can send a job request after an ENQ or batch. You can send two levels of Job Requests:

Numeric Error Codes Only (0, 1, or 2)

Verbose (3 or 4)

Syntax `{J,#}`

Field Type	Valid Options	Description
Identifier	J	Job Status Request
request#	0 1 2 3 4	Returns ASCII coded strings or numeric error codes Returns error number Returns number of labels printed in batch

Example `{J,3}`

The job response may not be immediate. If the printer has an error (out of supplies, ribbon problem, etc.), is in pause mode, or has insufficient memory, correct the problem and then resend the job request. If the problem is not corrected, no response is returned. If a formatting error has occurred, the job request will return the status. The printer must first interpret the format and batch data before returning the response.

Note: You may need to press **FEED/CUT** before the job response is returned.

To clear an error, press **ESCAPE/CLEAR**. An ENQ can also clear errors numbered less than 500. Once the error is corrected, a job request can be sent. The printer cannot accept another job request until the error is resolved.

Job Response

The Job Response varies, depending on the type of request sent to the printer. The following syntax is the response for a Job 0, 1,or 2 request.

Syntax `{J,Status1,Status2,"FMT-1","BCH-2"}`

Status1 These errors stop the print job. Examples include out of stock, supply faults, or data formatting errors. These errors are numbered less than 24 on the "Job Status 0, 1, 2 Response Table," later in this chapter.

Status2 These are errors in the syntax of the MPCL data stream. Printing does not stop, but the information may not print properly. These errors are numbered greater than 24 on the "Job Status 0, 1, 2 Response Table," later in this chapter.

FMT-1/BCH-2 The format or batch number is returned.

Here is an example of a response returned to a J 0, 1, 2 request:

```
{J,8,0,"FMT-1","BCH-2"}
```

Indicates that a portion of the format extends off the tag in format 1, batch 2. Refer to the "Job Status 0, 1, 2 Response Table" later in this chapter for brief explanations for J, 0, 1, 2 requests. In the above example, refer to error 8 for an explanation.

The following syntax is the response for a Job 3 request. You may need to press FEED/CUT before the job response is returned.

Syntax `{J,"Status1 A,B","Status2 A,B,C,D,E","FMT-1","BCH-2"}`

"Status1 A,B" Status1 A contains the field number, in the format or batch, where an error was found. If the error is not in the format or batch, a "0" is returned.

Status1 B contains an error number, which represents the actual printer error. The error numbers can be found in Chapter 8, "Diagnostics and Errors."

Example `{J,"2,612",}`

2 is the field number where an error was found. **612** is the error number, indicating that data is missing or does not match the format definition for that field.

Note: Error numbers found in Status1 B, always have a value equal to or greater than 500. These are considered very serious errors.

"Status2 A,B,C,D,E" contains the packet type, field type, field number, parameter, and error number.

Status2 A- Packet Type represents the MPCLII packet that the error occurred on. The packet could be Format (**F**), Batch (**B**), Check Digit (**A**), Graphic (**G**), or Font (**W**).

Status2 B- Field Type represents the MPCLII field that the error occurred on. If the packet has no fields, Status2 A will be replicated. If the error occurs before the field is identified a question mark is sent. Since the batch data is variable, a **D** is sent to indicate data.

Status2 C- Field Number represents the field number within each packet. The packet header is the first field and each subsequent field is indicated by the field separator.

Status2 D- Parameter represents the parameter within the field that the error occurred. The numbering begins after the field identifier.

Status2 E- Error Number is the error that coincides with the error numbers presented in Chapter 8, “Diagnostics and Errors.”

“FMT-1/BCH-2" The format or batch number is returned.

Note: If more than one error occurred, only the most serious error is acknowledged.

```
{J,"","F,B,4,6,33","FMT-1","BCH-2"}
```

Indicates that an error occurred on a bar code (**B**) field within a format (**F**) packet. The bar code field is the fourth (**4**) field in the packet. The error occurred in the sixth (**6**) parameter of the field. Error number **33** means the bar code density is invalid.

To clear an error, press **ESCAPE/CLEAR**. An ENQ can also clear errors numbered less than 500. Once the error is corrected, a job request can be sent. The printer cannot accept another job request until the error is resolved.
The following syntax is the response for a Job 4 request.

Syntax `{J,printed,total,"FMT-1","BCH-2"}`

printed the number of tags or labels already printed in the batch.

total the total number of tags or labels to be printed in the current batch.

“FMT-1/BCH-2" The format or batch number is returned.

Example `{J,8,25,"FMT-3","Bch-2"}`

8 out of **25** tags or labels have been printed from format number **3**.

Use a Job Request 4 when printing in the on-demand mode with a large number of tags or labels from a single batch. A Job Request 4 may not be accurate if tags or labels are printed in continuous mode, because of the response time involved. A Job Request 4 is not useful in single ticket batches (printing 1 of 1) or multiple single ticket batches.

Note: A batch has to be printing when you send the job request. You cannot use this job request on batches printing formats with incrementing fields.

Job Status 0, 1, 2 Response Table (Status 1 Codes)

Number	Meaning
0	No error
1	Stacker fault
2	Supply problem
4	Hot printhead
5	Printhead open
6	Insufficient memory
7	Ribbon problem
8	Field ## extends off tag
9	Field ## has a bad font/bar code
10	Field ## contains invalid data
11	Field ## has a graphic missing
12	Invalid communication channel
13	Invalid file type
14	All communication channels are busy
15	Receive overrun error
16	Receive parity error
17	Receive framing error
18	Receive buffer full
19	Label waiting
21	Bad dots (verifier detected a failure)
23	Low battery
24	Memory configuration packet error

Numbers 25 through 50 are not currently in use.

Job Status 0, 1, 2 Response Table (Status 2 Codes)

Number	Meaning
51	Invalid command
52	Invalid separator value
53	Graphic not found
54	Format for batch not found
55	Quantity/Multiples out-of-range
56	Name descriptor too long
57	Invalid cut value
58	Invalid number-of-parts value
59	Invalid orientation value
60	Invalid thickness value
61	Invalid text field
62	Invalid bar code field
63	Data string too long
64	Invalid data field
65	Row greater than stock length
66	Row greater than format length
67	Column greater than printhead width
68	Column greater than format width
69	Invalid label length
70	Invalid label width
71	Invalid increment/decrement value
72	Identifier out-of-range
73	No field to create format
74	Stop location of a line is out of range
75	Syntax error
80	Can’t use offline format for online batch
81	Can’t queue graphic batch
82	Can’t store online format
83	Can’t queue online batch
84	Can’t queue online clear command

Status Polling Considerations for Script Mode

The following table shows the effects of the I Packet and the printer's front panel (or keyboard) on status polling and immediate commands.

	I Packet Printer Configuration Packet (inside the script or sent online to the printer)	**While Running in Script Mode ONLY (set through printer's front panel)**	
		Disabled	Enabled
Status Polling	**OFF** (status polling not enabled by I packet)	**OFF** (status polling not enabled through printer's front panel)	**OFF** (status polling enabled through printer's front panel)
	ON (status polling enabled by I packet)	**OFF** (status polling not enabled through printer's front panel)	**ON** (status polling enabled through printer's front panel)
Immediate Commands	**OFF** (immediate commands not enabled by **I** packet)	**OFF** (immediate commands not enabled through printer's front panel)	**OFF** (immediate commands enabled through printer's front panel)
	ON (immediate commands enabled by **I** packet)	**OFF** (immediate commands not enabled through printer's front panel)	**ON** (immediate commands enabled through printer's front panel)

If status polling and immediate commands are NOT enabled through the I Packet, enabling status polling and immediate commands at the printer's front panel has NO effect.

DIAGNOSTICS AND ERRORS 8

This chapter explains how to

- print diagnostics labels
- reset the printer
- call Technical Support.

Before you call Service, print a test label. The label contains information to help diagnose mechanical and setup problems.

This chapter also provides explanations of your printer's errors. The errors are classified by type and are listed in order. If you have trouble loading supplies or performing maintenance, refer to the *Operator's Handbook*.

Some errors numbered 400-438 and 500-574 are internal software errors. Errors numbered 703-758 are supply errors. Follow the directions provided with the error description to correct the problem. Errors numbered 900-999 are Hard Printer Failures. If you cannot clear an error, turn off the printer, wait several seconds and then turn on the printer. Call Technical Support if you receive any error message not listed in this chapter.

To clear a data error, press **ESCAPE/CLEAR**. If a formatting error occurs, the label prints; but data may be missing. Correct the format or batch and resend them to the printer. If a data error occurs, press **FEED/CUT** to queue and print an error label.

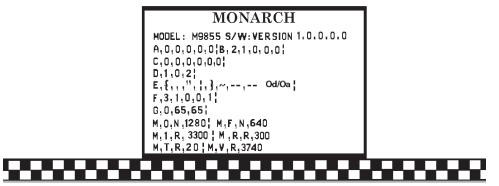
Printing a Test Label

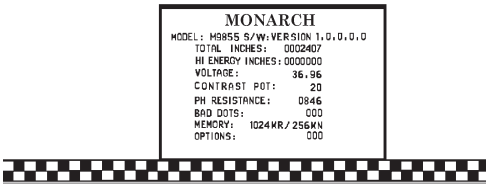
1. From the User Diagnostics menu, press **the right arrow** until you see

USER DIAG Test Label

2. Press **ENTER/PAUSE**.

The test label shows the model number, software version, total number of inches printed, voltage, print contrast, printhead resistance, code page, MPCL control characters, ENQ and RS232 characters.





Reading a Test Label

The first label shows the printer's configuration by packet (A-M). See Chapter 2, "Configuring the Printer," for more information. The lines beginning with **M** show the printer's memory allocation, which can be changed. The units for supply position, etc. are displayed in dots, even if you entered them in English or Metric units.

The second label shows the model number, software version, total number of inches printed, number of inches printed by current printhead, voltage, print contrast, printhead resistance, number of bad dots, and installed options (see the following table). The test label for the 9855 and 9860 printers show an inch count for the high energy ribbon. The one-dot rule line at the bottom of the test label indicates the vertical 0,0 point.

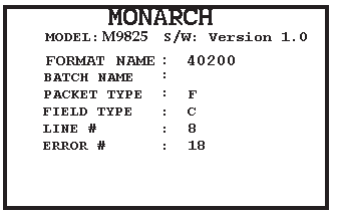
Installed Options	Description
A	Network Control Language (NCL)
B	Battery
C	Cutter (Knife)
H	High Speed (12 ips)
L	Smart Relay
P	Peel mode
R	RS-232 option (Keypad)
S	Stacker
V	Verifier

If You Receive an Error Message

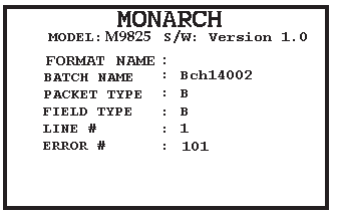
Any time you receive a message that is not described in this manual, or the recommended action does not solve the problem, call Technical Support. Some errors are the result of communication problems. In this case, reset your printer and reboot your computer. If you change any of the online configuration packets, resend the format packet to the printer, so the configuration changes take effect.

Reading an Error Label

An error label queues and prints when you press FEED/CUT after a data error (0-499) occurs. The error label contains the packet type, field type, line number, and error number. The packet and field type return the first letter after the { or ¦. A "?" is returned if the letter cannot be determined. The line number refers to which line in the packet the error occurs. The error number is the three-digit error code. Use this information to correct the format, batch, font, check digit, graphic, or online configuration packet.



The first label shows an error in line 8, which is a constant text field within the format packet. The error number is 18.



The second label shows an error in line 1 of the batch packet. The error number is 101.

If the PC and Printer Are Not Communicating

If your PC is having trouble communicating with your printer, follow these steps:

Check any messages that occur at the printer and at the computer. See the following error message listing in this chapter for more information.

Make sure you are using the correct printer cable.

Make sure the cable is plugged into the correct port on the computer.

Compare your printer's communications settings (especially flow control) with the settings on your PC. Your printer and PC communications should match. Print a test label to identify the printer's communication settings.

Make sure the printer is online (ready to receive data).

If all of the above are correct, reset your printer. Try the function again. If you still can not establish communications, call Technical Support.

Resetting Printers

Sometimes, the printer receives mixed signals and loses its ability to communicate. If this happens, reset the printer and attempt communication again. To reset the printer, turn off the printer, wait 15 seconds, and turn it back on.

When you turn off the printer, all the information set through the online configuration packets (A-M) is saved. See the sections in Chapter 2, "Configuring the Printer," for more information about each packet.

Calling Technical Support

Technical support representatives are available Monday through Friday during regular business hours. Follow these steps before you call:

1. Make sure your PC and printer are properly connected.
2. Record any error messages that occurred.
3. Recreate the problem, if you can.
4. Check your port settings. Your problem may be corrected simply by changing the communication settings.
5. List any changes that have recently been made to the system. Try to record what you were doing when the problem occurred.
6. Reset your printer. For information on resetting your printer, see "Resetting Printers."
7. Reboot your computer. Refer to your computer documentation for specific instructions.
8. Print a test label, see “Printing a Test Label” for more information.

Have the following information ready before you call: computer brand name and model, version of DOS, printer model, other peripheral devices on your system, support agreement, contract number, or invoice information, customer number, and printer serial number.

Additional Diagnostics Information

For detailed printer diagnostics information, refer to the Operator’s Handbook. See Chapter 7, “Status Polling,” for information on requesting printer and job status. See the following error message listing in this chapter for more information.

Data Errors

Errors 001 to 499 are data errors. These errors are returned in response to a J,3 request. See Chapter 7, “Status Polling,” for more information. A data error indicates that incorrect data was received from the host, causing the printer to ignore the entire print job. After checking the packet and correcting the problem, transmit the print job again.

The following is a list of data errors. These errors occur because data in the format, batch, check digit, font, or graphic packet is invalid.

Format Errors

Error Code	Description
001	Packet ID number must be **1** to **999**.
002	Name must be **1** to **8** characters (excluding non-printable control characters) inside quotes. The range is **1** to **256** characters for the 9855 XML-enabled printer.
003	Action must be **A** (add) or **C** (clear).
004	Supply length is invalid. See “Defining the Format Header” in Chapter 3 for valid lengths.
005	Supply width is invalid. See “Defining the Format Header” in Chapter 3 for valid widths.
006	Storage device must be **F** (Flash), **R** (volatile RAM), or **T** (temporary for graphics).
007	Unit of measure must be **E** (English), **M** (Metric), or **G** (Dots). See “Defining the Format Header” in Chapter 3 for more information.
010	Field ID number is outside the range **0** to **999**.
011	Field length exceeds **2710**.
012	Row field position is greater than the maximum stock dimension. See “Defining Text Fields” in Chapter 3 for valid row lengths.

013 Column field position is greater than the maximum stock dimension. See “Defining Text Fields” in Chapter 3 for valid column widths.

014 Font style must be **1**, **2**, **3**, **4**, **5**, **6**, **10**, **11**, **15**, **16**, **17**, **18**, **50**, or **56**. See “Defining Text Fields” in Chapter 3 or Appendix B, “Fonts,” for more information.

015 Character rotation must be **0** (0 degree), **1** (90 degree), **2** (180 degree), or **3** (270 degree). See “Defining Text Fields” in Chapter 3 for more information.

016 Field rotation must be **0** (0 degree), **1** (90 degree), **2** (180 degree), or **3** (270 degree). See “Defining Text Fields” in Chapter 3 for more information.

017 Field restriction must be **V** (variable) or **F** (fixed).

018 Code page/symbol set selection defined in the field must be **0** (Internal), **1** (ANSI), **100** (Macintosh), **101** (Wingdings), **102** (Unicode), **103** (BIG5 for Unicode), **104** (GB2312 for Unicode), **105** (SJIS for Unicode), **106** (GB2312), **107** (BIG5), **437** (DOS Page 437), **850** (DOS Page 850), **852** (Latin 2), **855** (Russian), **857** (Turkish), **860** (Portuguese), **1250** (Latin 2), **1251** (Cyrillic), **1252** (Latin 1), **1253** (Greek), **1254** (Turkish), **1255** (Hebrew), **1256** (Arabic), **1257** (Baltic), or **1258** (Vietnamese). See “Defining Text Fields” in Chapter 3 for more information.

020 Vertical magnification must be **1** to **7** or **4** to **255** (point size) for the scalable or downloaded TrueType fonts.

021 Horizontal magnification must be **1** to **7** or **4** to **255** (point size) for the scalable or downloaded TrueType fonts.

022 Color must be **A**, **B**, **D**, **E**, **F**, **N**, **O**, **R**, **S**, **T**, or **W**. See “Defining Text Fields” in Chapter 3 for more information.

023 Intercharacter gap must be **0** to **99** dots.

024 Field justification must be **B** (balanced), **C** (centered), **E** (end), **L** (left), or **R** (right). See “Defining Text Fields” in Chapter 3 for more information.

025 String length is outside the range **0** to **2710**.

030 Bar code height must be at least **19** (English), **48** (Metric), **38** (203 dpi Dots), **57** (300 dpi Dots), or is not within the supply dimensions.

031 Human readable option must be
- **0** default
- **1** no CD or NS
- **5** NS at bottom, no CD
- **6** CD at bottom, no NS
- **7** CD and NS at bottom
- **8** no text

032 Bar code type is invalid. See “Defining Bar Code Fields” in Chapter 3 for valid options.

033 Bar code density is invalid. See “Defining Bar Code Fields” in Chapter 3 for the bar code density chart.

040 Line thickness must be **0** to **99** dots.

041 Line direction must be **0, 90, 180,** or **270**.

042 End row is invalid. Line segment or box end row is defined outside of printable area.

043 End column is invalid. Line segment or box end column is defined outside of printable area.

044 Dot pattern for line or box must be “”.

045 Line length is defined beyond the maximum length. See “Defining Line Fields” in Chapter 3 for valid lengths.

046 Line type must be **S** (segment) or **V** (vector).

051 Imaging mode in the graphic header must be **0**.

052 Data type in the RFID Data Field must be **0**, **1**, **2**, or **3**. See “Defining the RFID Data Field” in Chapter 3 for more information.

Batch Errors

Error Code	Description
101	The format referenced by batch is not in memory.
102	Print quantity is outside the range **0** to **32000.**
104	Batch mode must be **N** (new) or **U** (update).
105	Batch separator in a batch control field must be **0** (Off), **1** (On), or **2** (Double).
106	Print multiple is outside the range **1** to **999.**
107	Cut multiple is outside the range **0** to **999**. Only valid for printers with a knife.
108	Multiple part supply is outside the range **1** to **5**.
109	Cut type is outside the range **0** to **5**.

Option Errors

Error Code	Description
200	Option number must be **1**, **2**, **3**, **4**, **5**, **6**, **20**, **21**, **30**, **31**, **42**, **50**, **51**, **52**, **60**, **61**, or **62**.
201	Copy length is outside the range **0** to **2710**.
202	Copy start position must be **1** to **2710.**
203	Destination start position must be **1** to **2710**.
204	Source field must be **0** to **999**.
205	Copy type must be **1** (copy after rules) or **2** (copy before rules).
206	Increment/Decrement selection must be **I** (increment) or **D** (decrement).

207 Incrementing start position must be **0** to **2710**.

208 Incrementing end position must be **0** to **2710**.

209 The incrementing amount must be **0** to **999**.

210 Security value for a PDF-417 bar code must be **0** to **8**. Correct the value and resend the format to the printer.

211 Narrow element value is less than **1** or greater than **99**. Correct the value and resend the format to the printer.

212 Wide element value is less than **1** or greater than **99**. Correct the value and resend the format to the printer.

213 Dimension must be **1** to **30** for a column or **3** to **90** for a row on a PDF417 bar code.

214 Truncation code must be **S** (standard) or **T** (truncated bar code).

215 Aspect code must be **C** (columns) or **R** (rows).

216 Option definition must be **S** (set) or **T** (template).

217 Input device device must be **D** (Default), **H** (Host), **K** (Keyboard), **N** (None), or **S** (Scanner).

218 Pad direction must be **L** (from left) or **R** (from right).

219 Pad character is outside the range **0** to **255**.

220 Check digit selection must be **G** to generate check digit.

221 Primary or secondary price format is outside the range **1** to **16**.

222 Data type restriction is outside the range of **1** to **6**.

223 Option is not valid for the field.

224 Bar code intercharacter gap must be **0** to **99** dots. (This is also known as the additional character gap when using Option 50, Defining Bar Code Densities.)

226	Rule (option) Record Line xx. The upload device must be **H** (host) for Option 6.

Online Configuration Errors

Error Code	Description
251	Power up mode must be **0** (online) or **1** (offline).
252	Language selection must be **0** (English), **1** (French), **2** (German), **3** (Spanish-ES), **4** (Japanese), **5** (Portuguese), **6** (Italian), **7** (Swedish), **8** (Spanish2-MX), **9** (Danish), **10** (Dutch), **11** (Finnish), or **12** (Norwegian).
253	Batch separator code in a system setup packet must be **0** (off), **1** (on), or **2** (Double).
254	Slash zero selection must be **0** (standard zero) or **1** (slashed zero).
255	Supply type must be **0** (black mark), **1** (die cut), **2** (non-indexed), or **3** (aperture).
256	Ribbon selection must be **0** (direct), **1** (transfer) or **2** (High Energy).
257	Feed mode must be **0** (continuous) or **1** (on-demand).
258	Supply position must be **-300** to **300** dots.
259	Contrast adjustment must be **-699** to **699** dots.
260	Print adjustment (position) must be **-99** to **99** dots (9825) or **-450** to **450** dots (9855/9860).
261	Margin adjustment (position) must be **-99** to **99** dots.
262	Speed adjustment must be **0** (default), **25** (2.5 ips), **40** (4.0 ips), **60** (6.0 ips), **80** (8.0 ips), **100** (10.0 ips), or **120** (12.0 ips).

263 Primary monetary symbol must be **0** (None), **1** (Dollar), **2** (Pound), **3** (Yen), **4** (Deutsche Mark), 5 (Franc), **6** (Peseta), **7** (Lira), **8** (Krona), **9** (Markka), **10** (Schilling), **11** (Rupee), **12** (Ruble), **13** (Won), **14** (Baht), **15** (Yuan), or **16** (Eurodollar).

264 Secondary symbol selection must be **0** (none) or **1** (print secondary sign).

265 Monetary decimal places must be **0** to **3**.

266 Character string length in the control characters packet must be **5** (MPCL control characters) or **7** (ENQ/IMD command character).

267 Baud rate selection must be **0** (1200), **1** (2400), **2** (4800), **3** (9600), **4** (19200), **5** (38400), **6** (57600), or **7** (115200). Resend the communication settings packet.

268 Word length selection must be **0** (7 bits), or **1** (8 bits). Resend the communication settings packet.

269 Stop bits selection must be **0** (1 bit), or **1** (2 bits). Resend the communication settings packet.

270 Parity selection must be **0** (none), **1** (odd), or **2** (even). Resend the communication settings packet.

271 Flow control selection must be **0** (none), **1** (DTR), **2** (CTS/RTS), or **3** (XON/XOFF). Resend the communication settings packet.

272 Symbol set (code page) in the System Setup packet must be **0** (Internal), **1** (ANSI), **2** (DOS 437), **3** (DOS 850), **4** (1250- Latin 2), **5** (1251- Cyrillic), **6** (1252- Latin 1), **7** (1253- Greek), **8** (1254- Turkish), **9** (1255- Hebrew), **10** (1256- Arabic), **11** (1257- Baltic), **12** (1258- Vietnamese), **13** (852- Latin 2), **14** (855- Russian), **15** (857- IBM Turkish), **16** (860- DOS Portuguese), **17** (Wingdings), **18** (Macintosh), **19** (Unicode), **20** (BIG5), **21** (GB), **22** (SJIS to SJIS), **23** (GB to GB), **24** (BIG5 to BIG5), or **25** (KSC to KSC).

273 Cut adjustment must be -**300** to **300** dots.

282 RS232 Trailer string is too long. Use a maximum of **3** characters.

283 ENQ Trailer string is too long. Use a maximum of **3** characters.

284	The buffer type must be **D** (Downloadable Fonts), **F** (Format), **I** (Image), **R** (Receive), **T** (Transmit), or **V** (Scalable Fonts).
285	The storage device type in the memory configuration packet must be **F** (flash) or **R** (volatile RAM).
286	The buffer size is invalid.
287	The printhead width must be **0**.
288	The battery voltage must be **0** (15-volt battery) or **1** (12-volt battery).
289	The printer address specified in the communication settings packet must use exactly six characters.
290	Action must be **0** (disable), **1** (enable), or **2** (extended) for the backfeed control packet or the printer is active.
291	Dispense position must be **50** to **200** dots or the printer is active.
292	Backfeed distance must be **10** to **200** dots or the printer is active. The backfeed distance can not be greater than the dispense position.
293	The skip index selection defined in the field must be **0** (disabled) or **1** (enabled). Correct the packet and resend to the printer.
294	The verifier mode must be **0** (disable) or **1** (enable).
295	The verifier's cable detect mode must be **0** (no detect), **1** (I/O cable detect), or **2** (I/O and data cable detect).

Check Digit Errors

Error Code	Description
310	Check digit scheme number must be **1** to **10**.
311	Modulus must be **2** to**11**.

314	Check digit algorithm must be **D** (sum of digits) or **P** (sum of products).

Graphic Errors

Error Code	Description
325	Duplicating direction must be **0** (insert after) or **1** (insert before) in duplicate fields for graphics.
327	Amount of row adjustment must be **0** to **999** dots in duplicate fields for graphics.
328	Duplicate count must be **0** to **999**.
340	Bitmap line encoding must be **H** (hex) or **R** (run length).
350	Font selector must be **1** to **9999**.
351	Font data length must be **68** to **16384**.
352	Insufficient font memory is available for the downloaded font.
380	Job request is outside the range **0** to **4**.
400	The character immediately following **{** is invalid.
402	Field separator is not in the expected location.
403	Field separator was not found.
404	The number (greater than five digits/732,000), string (greater than **2710**), or tilde sequence (greater than **255**) currently being processed is out of range.
405	Too many fields exist in the format. You cannot have more than **1000** fields in the format. Lines, boxes, and constant text fields count as fields.
406	Parser error. Format or graphic is already in use. Make sure your packet not missing ¦ or {} characters.

Communication Errors

Error Code	Description
409	The printer memory is full. Delete unnecessary formats or graphics from memory. If you are using a graphic file that is very large, consider using another mapping method (such as run length encoding) to reduce the required memory. To use flash memory, you must format it first. See “Formatting Flash Memory” in Chapter 2 for more information.
410	Parity on the printer does not match the parity on the host. Check the parity setting under SETUP options.
411	Framing error. The printer cannot communicate with the host. Make sure the host is turned on, communication cables are connected correctly, port settings are correct, and communications are active. Check the baud rate, word length, and stop bits to make sure they match those at the host. Do not toggle between Microsoft Windows and MS-DOS while using the COPY command, or you will receive a framing error. Exit Windows **before** using the COPY command. Re-transmit the data.
412	There is a problem with flow control between the printer and the host. Make sure the printer and the host flow control settings match (both are DTR or both are XON/XOFF). If the error persists, call Technical Support.
413	Online receive buffer is full. Check your printer’s XON/XOFF or DTR SETUP values to be sure there is not a flow control problem.
414	The internal keyboard buffer is full or you need a new keypad. Call Technical Support.
415	The buffer size you defined exceeds the total available in your machine.
416	Flash/PC board error. Call Technical Support.

417 Flash memory is full. Clear flash. Resend the format, graphic, and check digit packets. If the error reappears, call Technical Support.

420 Internal software list error. Call Technical Support.

421 Internal software list error. Call Technical Support.

422 Duplicate internal name. Call Technical Support.

423 Internal software error. Call Technical Support.

424 Internal software list error. Call Technical Support.

425 Internal software list error. Call Technical Support.

426 Internal software list error. Call Technical Support.

427 Format name is invalid. Valid name is **1** to **8** characters inside quotes or **“”** for a printer-assigned name. Press **ESCAPE/CLEAR** and try to continue. If the error reappears, call Technical Support.

428 Batch name is invalid or graphic not found. Press **ESCAPE/CLEAR** and try to continue. If the error reappears, call Technical Support.

429 A field number appears more than once in a format.

430 The format uses a graphic or verifier configuration packet that cannot be found.

433 The batch references a field number that does not exist in the format.

497 An error occurred during the loop back test on the parallel port. Call Service.

499 An error occurred during the loop back test on the serial port. Call Service.

Data Formatting Failures

Formatting errors indicate that a field will print incorrectly. After you have checked the data stream and corrected the data, retransmit the format and batch.

Note: For errors 571-622, the batch still prints, but the field, font, bar code, or density may be incomplete, missing or contain incorrect data.

Error Code	Description
571	UPC or EAN bar code data length is invalid. The bar code data length in the batch does not fit the format.
572	A copy field, padded field, or incrementing field length is invalid. The field length in the batch does not fit the format or the field contains blanks. Or, the fixed length field does not contain the specified number of characters.
573	Price field length is invalid. The price field length in the batch does not fit the format or the field contains blanks.
574	No CD scheme or room for CD. The CD scheme in the batch does not fit the format or the field contains blanks.
575	The graphic included in your format could not be found. Resend the graphic packet. If the error persists, call Technical Support.
600	The printer could not image the batch, because the batch was refused. Call Technical Support.
601	An error occurred while the batch was imaging. Resend the format, batch, font, and/or any graphic packets. If the error persists, call Technical Support.
603	The batch was not found while imaging. Resend the batch packet. If the error persists, call Technical Support.
611	Font, bar code or density is invalid. The font, bar code or density in the batch does not fit the format.

612 The data in this line of the batch is either missing or does not match the format.

613 Reference point off tag.

614 Portion of field off tag. There may be an invalid character in the packet. Make sure you did not enter **O** for **Ø**.

615 Bar code width is greater than 16 inches or the number of keywords for your PDF 417 bar code exceeds **928**. Decrease the density or shorten the amount of data to print the bar code.

616 A bad dot falls on a bar code and the dot cannot be shifted. A gray box is printed instead of the bar code. However, 2D bar codes still print on the 9825 printer when bad dots are present within the bar code field.

618 Magnification must be **1** to **7** or **4** to **255** (point size) for the scalable font.

619 The JIS (16-bit) code for Kanji is invalid.

620 Font and printhead dot density mismatch. A 300 dpi font is specified in the format, but a 203 dpi printhead is used in the printer or vice-versa. Check the font or change the printhead to correct the error.

621 An error occurred opening the TrueType font file. Select a different font to download. If the error message persists, call Technical Support.

622 Not enough memory to create the downloaded TrueType characters in the scalable (vector) fonts buffer. Reconfigure the printer's memory and increase the scalable (vector) fonts buffer. Resend the font, format, and batch packet after reconfiguring the memory. If the error message persists, call Technical Support.

Machine Faults

These errors occur when there is a problem with the printer.

Error Code	Description
703	The printer sensed a calibration of different-sized black marks. Make sure the correct supply is loaded.
704	Printer has not sensed a supply mark within the specified number of inches or out of supplies. Check the supply tracking supply marks black mark sensor position supply roll for binding. Press **ESCAPE/CLEAR**. If the error continues to appear, change the supply.
710	Band out of data. Call Technical Support.
711	UART receiving communication error (framing, parity, etc.). Call Technical Support.
712	Receiving failure or command overrun error. Call Technical Support.
713	Receiving failure or illegal command. Call Technical Support.
714	Receiving failure or undefined command. Call Technical Support.
715	Invalid data length/data mismatch. The data in the RFID Data Field has an incorrect data length or there is a data type mismatch between the selected data type and the actual data entered. See “Defining the RFID Data Field” in Chapter 3 for more information on the data length and for selecting the appropriate data type for the data being entered. This error also occurs if any of the Expanded C1Gen2 fields is invalid. The printer does not recalibrate (feed a blank label) after any RFID error.

730 A memory allocation error occurred during initialization.

732 RFID Hardware Error. A non-RFID printer received a format containing an RFID Data Field.

RFID Errors

These errors occur when there is an RFID problem.

Error Code	Description
740	Command, hardware, inventory, or memory allocation error. There may be an RFID hardware or memory allocation error. The printer does not recalibrate (feed a blank label) after any RFID error.
741	RFID tag missing. Tag not found in RF Field. The RFID tag was not found in the RF Field (area inside the printer where RFID tag is programmed.) Check supply loading. If you changed the supply or print position, make sure the RFID tag was not moved out of the programmable range. The printer does not recalibrate (feed a blank label) after any RFID error.
742	Tag erase failed. The RFID tag was found in the RF Field, but could not be erased. Increase the number of write retries. If this error occurs consecutively, increase or decrease the write power setting. If the write power is set too low, you may affect the data programmed in adjacent labels. The printer does not recalibrate (feed a blank label) after any RFID error. For more information, refer to your *RFID Setup Guide & Supply Chart*.
743	Program tag failed. The RFID tag was found in the RF Field, but could not be programmed. Increase the number of write retries. If this error occurs consecutively, increase or decrease the write power setting by one. If the write power is set too low, you may affect the data programmed in adjacent labels. The printer does not recalibrate (feed a blank label) after any RFID error. For more information, refer to your *RFID Setup Guide & Supply Chart*.

744 Tag locked fail. The RFID tag is unable to be programmed, because it is already locked. This is considered a bad RFID tag. The printer does not recalibrate (feed a blank label) after any RFID error.

746 Lock tag fail. The RFID tag has not been locked to prevent reprogramming. This is considered a bad RFID tag. The printer does not recalibrate (feed a blank label) after any RFID error.

747 Time out failure. Any RFID command (read, program, etc.) has failed to complete in the maximum amount of allowed time. The printer does not recalibrate (feed a blank label) after any RFID error.

748 Invalid data length/data mismatch from RFID interrogator module. The RFID interrogator module found a problem with the data received from the printer. The printer does not recalibrate (feed a blank label) after any RFID error.

749 RFID verify fail. The RFID verification process failed after writing (programming) the tag. This is considered a bad RFID tag. The printer does not recalibrate (feed a blank label) after any RFID error.

Machine Faults (continued)

Error Code	Description

750 Printhead is overheated. Turn off the printer to let the printhead cool. If the error persists, call Technical Support.

751 Printer did not sense a black mark when expected. The supply may be jammed. For errors 751-753, check the

- supply tracking
- supply marks
- black mark sensor position
- supply roll for binding.

Press **ESCAPE/CLEAR** and try to continue printing. If the error continues to appear, change the supply

752 Printer sensed a mark in the wrong place.

753 Printer sensed a mark that is too long.

754 Printer has a ribbon problem. Check the ribbon for a jam or remove any slack by turning the take-up reel clockwise. Load a new ribbon.

755 Printhead is open. Close the printhead before continuing. If the error persists, call Technical Support.

756 The printer is out of supplies. Load supplies.

757 Load supplies. The calibrated supply length differs by plus or minus .25 inches from the format. Press **FEED/CUT** to print on the current supply or load new supply and press **ENTER/PAUSE**.

758 Check supply. Either the supply is not seen, or the on-demand sensor is broken (purchase optional). Check for a label jam. Clear the supply path or reload supplies. This error may occur if you remove a label too quickly in on-demand mode. The printer does not recalibrate after this error.

759 Knife is not moving. Call Technical Support.

760 Knife jam. Call Technical Support.

761 The stacker is full or jammed. Empty the stacker or clear the jam before continuing. The printer does not recalibrate after this error.

762 Low Voltage. For DC-powered printers, recharge the external battery. For AC-powered printers, check the power inlet where the printer is connected. The acceptable voltage range is between 90-132 V_{RMS} and 180-264 V_{RMS}. If more or less power is received, unpredictable results may occur.

763 Waiting to dispense label. Press **FEED/CUT**.

764 Verifier scan error (bad scan) on label when using normal (no overstrike) mode. Press **ESCAPE/CLEAR** to clear the error and continue printing. Make sure you did not apply Option 62 (do not scan a particular bar code) to all bar codes on a format.

765 The printhead has less than **8** bad dots. The printer can shift bar code fields to avoid bad dots. You may need to press **ESCAPE/CLEAR** to continue printing. Print a test label to confirm the number of bad dots.

766 Backfeed/overfeed error. There is a problem with the backfeed or overfeed distance.

767 Incorrect AD value. Call Technical Support.

768 Printhead has more than **8** bad dots within the format area or is not connected. Make sure the printhead is connected.

769 The printhead is not receiving enough volts. Call Technical Support.

770 The print motor is not ready. Call Technical Support.

771 The format specified by the application was not found. Reload your application and format, and try again. If the problem continues, call Technical Support.

772 Verifier scan error (bad scan) on label or multiple labels in a row when using overstrike and continue mode. Press **ESCAPE/CLEAR** to clear the error and continue printing.

773 Verifier Failure - the verifier is enabled, but not connected. The printer can detect if the I/O and/or serial cables are connected to the verifier. Refer to your verifier's *Operating Instructions* for more information.

781 The voltage is too low. Call Technical Support.

782 The voltage is too high. Call Technical Support.

783 The printer is printing too fast for the verifier to accurately scan the bar codes. Increase the bar code height in your formats or slow the print speed.

784 No power to stacker. Check connections between the stacker and the printer. Make sure the printer is connected to an AC outlet.

785 The internal liner take-up reel is full. Remove the liner take-up reel and dispose of the liner. Press **ESCAPE/CLEAR** to continue printing.

790 Wait until the printer is idle (no batch waiting to print or not receiving data) before you send any packets. This error may occur when you try to print a test label if the printer is busy.

791 The printer has an error pending. Turn off the printer. Wait 15 seconds and turn it back on. Resend the packets. If the problem continues, call Technical Support.

792 The printer is not initialized. Call Technical Support.

793 The printer job queue is full. Turn off the printer. Wait 15 seconds and turn it back on. Resend the packets. If the problem continues, call Technical Support.

794 The backfeed mode is not set.

795 Print engine lock-up. Call Technical Support.

Script Errors

These errors occur when there is a script (application) problem.

Error Code	Description
850	Invalid script packet or not enough flash memory for the script. The script download failed. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.
851	Invalid lookup table or not enough flash memory for the script. The lookup table download failed. Check the data in the lookup table. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.

852 Invalid buffer definition packet or not enough flash memory for the script. One or more of the following buffers were invalid: input buffer, temporary buffer, lookup buffer, printer, or array buffer. Check the buffer definitions. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.

853 Invalid version string or not enough flash memory for the script. The version information in the APPVERSION command is missing or invalid. Make sure the information is enclosed in double quotation marks. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.

854 Invalid table (string and numeric) data or not enough flash memory for the script. Check the data. Format flash memory and download the script using the COPY command from DOS or the ADK2 software.

855 Invalid start/clear command. The script is missing the start or clear command **{S space}**.

856 Invalid quit command. The script is missing the quit command **{Q space}**.

857 Illegal command in the script. Your script may include commands that have been removed from the ADK2 scripting language.

858 Check sum error. Each packet has a four-digit checksum at the beginning of the packet. Compile the script again using the ADK2 software.

859 Script download buffer overflow. The image buffer is used as the SCRATCH buffer. Increase the size of the image buffer.

Hard Printer Failure Errors

These errors are hard printer failures. Call Technical Support if you receive these messages.

Error Code	Description
900	RAM test failure.
901	ROM/EPROM checksum failure.
902	Software timer failure.
903	Software interrupt failure.
905	Illegal interrupt.
906	Non-maskable interrupt. Check format packet for font clear or format clear packets.
907	Low RAM error.
908	Non Volatile RAM checksum failure.
909	RAM corrupted.
910	Warm restart.
911	Version string mismatch.
930	Flash erase error.
931	Flash write error.
932	RAM write error.
933	Parity error.
934	Framing error.
935	Buffer overrun.
936	Invalid record type.

937 Invalid hex data.

938 Invalid checksum.

939 Invalid record count.

940 Invalid flash address.

Errors numbered 900-911 occur when you turn on the printer. They may indicate a circuit board failure. Errors numbered 930-940 are errors that may occur during the loading of flash memory. Errors numbered 950-999 indicate a circuit board failure. Call Technical Support if you receive any of these messages.

When a HARD failure (errors 900-999) occurs on the printer, the printer displays **WARNING** or **POWER DOWN** on the top line of the keypad display.

If this happens, record the displayed message and turn off the printer. If the problem reoccurs when you turn the printer on again, call Technical Support.

If the problem does not reoccur after you turn your printer on again, reset your printer's SETUP options. Retransmit your packets.

Printer Display	**Description**
WARNING RAM Test Failure	RAM check failed on power up. Reset your SETUP options. Transmit your packets again.
POWER DOWN ROM Sum Failure	ROM checksum test failed.
POWER DOWN Timer Failure	Timer test failed.
POWER DOWN Intr Test Failure	Interrupt test failed.
POWER DOWN Low System RAM	Not enough RAM for system. Reset your SETUP options. Transmit your packets again.
POWER DOWN Illegal Intr#	Illegal interrupt occurred.

POWER DOWN NMI Received	Non-maskable interrupt occurred. Reset your SETUP options. Transmit your packets again.
POWER DOWN Low Appl RAM	Not enough RAM for application. Reset your SETUP options. Transmit your packets again.
POWER DOWN NVRAM Sum Fail	RAM checksum test failed. Reset your SETUP options. Transmit your packets again.
POWER DOWN RAM Corrupt	Item storage RAM failed. Reset your SETUP options. Transmit your packets again.

PRINTER OPTIMIZATION 9

This chapter provides information on how to improve your printer's performance by

- adjusting the print quality
- reducing the imaging time for printing
- providing general tips and hints for designing formats.

This printer uses "smart imaging" to image and print fields on supplies. Smart imaging remembers the exact boundaries and locations of each field and places a boundary box (white space) around each field. When a field changes that particular boundary box is cleared and the new field data is imaged. However, the new field data may require a larger boundary box than the previous field did. In some cases, neighboring fields that do not change may be covered with white space from the changing field's boundary box. To prevent existing fields from being covered by a changing field, see "Option 61 (Reimage Field)" in Chapter 4.

Note: Smart imaging is automatically disabled on formats with a Data Matrix bar code.

Adjusting the Print Quality

Many factors affect print quality: type of supplies, print speed, print contrast, and the type of printer's application. This printer supports both thermal transfer and thermal direct supplies. The type of supply should match the printer's application.

If you want to print at high speeds, you should use premium supplies. Using premium supplies reduces smudged images, hard to read labels, and faded print. Supply type, print speed, and print contrast work together to improve the print quality of labels. Contact your Sales Representative for more information.

Select the print speed based on desired throughput and print quality. If print quality is more important, reduce the print speed, because a lower print speed increases the print quality of labels. If throughput is more important, increase the print speed as high as it will go to give you the needed print performance. See "Increasing Throughput" for more information.

If the print quality is too light or too dark, adjust the print contrast. The correct contrast setting is important because it effects how well your bar codes scan and how long the printhead lasts.

Be sure to check the print quality of bar codes with a bar code verifier or scanner. If you do not have a verifier or scanner, check the bar code visually. A bar code that is **IN SPEC** will have complete bars and clear spaces. Small alphanumeric characters will look complete. A bar code that is **IN SPEC** may not look as good as one that is too dark, but it will have the highest scan rate.



Dark **IN SPEC** **Light**

Note: For highest scan rates, make sure there is adequate white space before and after the bar code. Also, a darker bar code does not mean it will scan better.

The following non-print zones are recommended:

All Supplies	.050 inches on either edge of the label.
All Supplies	.020 inches at the end of the label.

If using the optional verifier, allow a minimum no-scan zone on the trailing edge of the label of 0.5 inches (13 mm).

Reducing Imaging Time

Imaging time is the time it takes the printer to image the data for the first label after the printer receives the format and batch packet. There are several ways to reduce the imaging time: send formats and configurations once, use a batch quantity of zero, or update batch fields.

If the formats use the same check digit scheme, you only need to send the check digit scheme once.

Send formats once and use the batch update field to change information on the label. Using a batch update field reduces the imaging time, because only the fields that change are imaged. All other fields remain the same as the last queued batch.

Use the batch quantity zero method when your application requires operator intervention to enter data. While the operator is entering data, the previous field is sent with a batch quantity of zero. The printer images the field, but does not print it. After the operator enters the data for the last field, the batch quantity can be specified. The last remaining field is imaged, and the label prints almost immediately.

To pre-image a label:

1. Send the format and a batch header in one file. The first time you send the batch header, use the parameter **N** (new batch), and the parameter **0** for (zero quantity).

Example

```
{B,1,N,0 ¦}
```

The printer images constant text, line, box, and graphic fields, but does not print them.

2. Input data for each field, and send it with a batch header using the parameter **U** (update) and a quantity of zero. When the printer receives the data, it immediately images the field, but does not print it.

Example

```
{B,1,U,0 ¦
1,"RODGER DIST CTR" ¦ }
{B,1,U,0 ¦
2,"8292" ¦ }
```

At this time, the printer is imaging all associated fields, including fields that copy from other fields.

3. Repeat step 2 for each field except the last one.

```
{B,1,U,0 ¦
3,"BROADWAY" ¦ }
{B,1,U,0 ¦
4,"555 WEST OAK AVE." ¦ }
```

4. For the last field, input data and send it with the quantity of labels you want printed. When the printer receives input for the last field, it immediately prints the labels.

Example

```
{B,1,U,10 ¦
5,"DAYTON, OHIO" ¦ }
```

Increasing Throughput

Reducing the imaging time increases throughput. You can also increase the baud rate to increase the transmission time and increase throughput. Make sure the communication settings at the printer match those at the host. Using a baud rate of 19200 is almost twice as fast as 9600 baud. Using a baud rate of 38400 is almost twice as fast as 19200 baud.

General Format Tips and Hints

The following tips and hints are helpful to keep in mind when designing MPCLII formats.

With Packets

Leave parameters blank that you do not need to change when sending online configuration packets. For example, {**I**,A,,,,1 ¦} prints a slashed zero and uses the last sent online system setup parameters.

You can group fields with similar parameters. For example

```
T,1,10,V,250,50,1,1,1,1,B,C,0,0¦
T,2,15,,,75¦
T,3,,,,100¦
```

The first text field sets all the parameters for that field. The second text field's number of characters and column location changes from what was defined in the first field. In the third text field, only the column location is changed. This method can be used on bar code and constant text fields as well.

Note: You should understand the basics of each field before using this method.

After you modify any fields or parameters with the optional entry method, resend the format, batch, or configuration packet to the printer.

With Bar Codes

Be careful when rotating or placing a UPC/EAN bar code with human readable characters, because the bottom reference point is at the bottom of the bars, **not** at the bottom of the human readable characters.

With Fields

Data that remains the same for each label should be in a constant text field. Data that varies for each label should be in a text field.

Check for trailing spaces in text or constant text fields if you receive a "field off tag" error. An easy way to see trailing spaces is to print the field in the reverse font.

Make sure if you magnify a field, it does not go off the label or cover another field. Magnifying a field increases the distance between the printed character and the edge of the cell.

SAMPLES



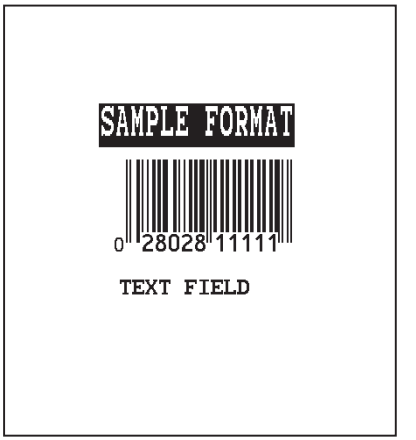
This appendix contains sample formats. You can customize any of these formats to meet your needs.

Sample UPCA Format Packet

```
{F,25,A,R,E,200,200,"Fmt 25" ¦
C,140,40,0,1,2,1,W,C,0,0,"SAMPLE FORMAT" ¦
B,1,12,F,85,40,1,2,40,5,L,0 ¦
T,2,18,V,50,50,1,3,1,1,B,L,0,0 ¦ }
```

Sample Batch Packet

```
{B,25,N,1 ¦
1,"02802811111" ¦
2,"TEXT FIELD" ¦ }
```



Sample MaxiCode Packets

MaxiCode is a two-dimensional bar code developed by UPS (United Parcel Service, Inc.). Data must be defined in a specific way for UPS. Refer to the Guide to Bar Coding with UPS or the AIM MaxiCode Specification for more details about data requirements.

The printer supports modes 0, 1, 2, and 3. Contact us for information about additional MaxiCode modes.

Mode	Description
0	Obsolete
1	Obsolete
2	Structured Message
3	Structured Message

You can select which mode to use in the bar code field or allow the printer to auto-select the mode (0, 2, or 3) based on your data. See “Defining a Bar Code Field” for more information. MaxiCode automatically pads data with the “!” character.

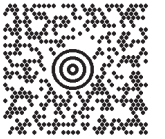
Note: MaxiCode does not support the NULL character.

Modes 2 and 3 are defined by the way the postal code, class of service, and country code fields are arranged. (The postal code, class of service, and country code are required fields.) Begin with the message header, then the primary data (15 characters), followed by the secondary message (up to 78 characters). Or, begin with the primary data, then the message header, followed by the secondary data. If the postal code data characters are all numeric then the MaxiCode symbol is set to Mode 2. If the characters are alphanumeric, or only contain ASCII characters 65 to 90, then the MaxiCode symbol is set to Mode 3.

If you receive an error 612, check your MaxiCode data. You may have not correctly structured or left out one of the three required fields (postal code, class of service, and country code) or the “~029" character.

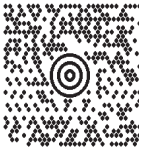
Mode 0 (Obsolete) Sample

{F,1,A,R,E,0200,0200,"MAXICODE" ¦	
B,1,93,V,020,20,33,7,0,8,L,0 ¦ }	MaxiCode bar code (33)
{B,1,N,1 ¦	Batch header
1,"450660000" ¦	Postal code- zip code
	(This field determines Mode)
C,"001" ¦	Country code
C,"840" ¦	Class of service
C,"[)~030" ¦	Message header
C,"01~02996" ¦	Transportation header
C,"1Z12345678~029" ¦	Tracking number
C,"UPSN~029" ¦	Origin carrier SCAC
C,"12345A~029" ¦	UPS shipper number
C,"070~029" ¦	Julian day of pickup
C,"~029" ¦	Shipment ID (empty)
C,"1/1~029" ¦	Package count
C,"15~029" ¦	Weight (lb.)
C,"Y~029" ¦	Address validation
C,"60 SADDLEBROOK CT.~029" ¦	Street address (empty)
C,"DAYTON~029" ¦	City (empty)
C,"OH~030" ¦	State
C,"~004" ¦ }	EOT



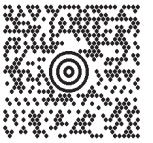
Mode 2 Sample

{F,1,A,R,E,200,200,"MAXI_M2" ¦	
B,1,93,V,020,020,33,7,0,8,L,0 ¦ }	MaxiCode bar code (33)
{B,1,N,1 ¦	
1,"[)>~030" ¦	Message header
C,"01~02996" ¦	Transportation header
C,"068100000~029" ¦	Postal Code
	(This field determines Mode)
C,"840~029"¦	Country code
C,"001~029"¦	Class of service
C,"1Z12345675~029"¦	Tracking number
C,"UPSN~029"¦	Origin carrier SCAC
C,"12345E~029"¦	UPS shipper number
C,"089~029"¦	Julian day of pickup
C,"~029"¦	Shipment ID (empty)
C,"1/1~029"¦	Package count
C,"10~029"¦	Weight (lb.)
C,"Y~029"¦	Address validation
C,"~029" ¦	Street address (empty)
C,"~029" ¦	City (empty)
C,"CT~030"¦	State
C,"~004"¦ }	EOT



Mode 3 Sample

`{F,1,A,R,E,200,200,"MAXI_M3" ¦`	
`B,1,93,V,020,020,33,7,0,8,L,0 ¦ }`	MaxiCode bar code (33)
`{B,1,N,1 ¦`	
`1,"[)>~030" ¦`	Message header
`C,"01~02996" ¦`	Transportation header
`C,"M5E1G45~029"¦`	Postal Code
	(This field determines Mode)
`C,"124~029"¦`	Country code
`C,"066~029"¦`	Class of service
`C,"1Z12345679~029" ¦`	Tracking number
`C,"UPSN~029" ¦`	Origin carrier SCAC
`C,"12345E~029" ¦`	UPS shipper number
`C,"089~029" ¦`	Julian day of pickup
`C,"~029"¦`	Shipment ID (empty)
`C,"1/1~029"¦`	Package count
`C,"10~029"¦`	Weight (lb.)
`C,"Y~029" ¦`	Address validation
`C,"~029"¦`	Street address (empty)
`C,"TORONTO~029" ¦`	City (empty)
`C,"ON~030"¦`	State
`C,"~004" ¦ }`	EOT



MaxiCode Compression Sample

Once the data is properly encoded in the compressed format as rendered by the UPS.dll, the UPS scanners and software do the translating of the compressed data when reading the symbol. Our printers take the input data as-is and encode it as a standard MaxiCode symbol. Without the UPS encoded scanners and software, generic scanners interpret the encoded data exactly as it appears in the symbology without decompressing its contents.

```
28,"[)>~030" ¦
C,"01~02996" ¦
C,"453420000~029" ¦
C,"840~029" ¦
C,"013~029" ¦
C,"1Z12121212~029" ¦
C,"UPSN~029" ¦
C,"564W65~030" ¦
C,"07’4N%KKL8X5~044" ¦
C,"9T#VO:Z+Z 0~028" ¦
C,"SFBH3R#&ZAT/~028" ¦
C,"87EPJ)~028" ¦
C,"S~013" ¦
C,"~030" ¦
C,"~004" ¦
```

Sample Data Matrix Packets

Data Matrix (ECC-200) is a two-dimensional bar code which is made up of square modules arranged within a perimeter finder pattern. There are 24 square symbol sizes available ranging from 10 rows by 10 columns to 144 rows by 144 columns. There are six rectangular symbol sizes available ranging from 8 rows by 8 columns to 16 rows by 48 columns. The symbol size is data dependent. Data Matrix automatically pads data.

Make sure you do not overlay other fields when designing your Data Matrix symbol. Smart imaging is automatically disabled on formats with a Data Matrix bar code. You should also allow a 3 or 4 dot "quiet zone" (blank space around the bar code's perimeter) for scanning. See "Defining a Bar Code Field" for more information.

Sample Batch Data with Special Characters

To use this character in the bar code	enter these characters in the batch data
null character	~~@
~ (tilde)	~126~126
FNC1	~~1

Square Data Matrix Packet



```
{F,36,A,R,E,400,400,"DTMTRX1" ¦
B,1,50,V,50,100,35,0,100,8,L,0¦}

{B,36,N,1 ¦
1,"1234567890ABCDEFGHIJKLMNOPQRST"¦ }
```

This example prints a one-inch wide by one-inch tall (**100**) square Data Matrix symbol using the default density (**0**) without any field rotation (**0**).

Rectangular Data Matrix Packet



```
{F,36,A,R,E,400,400,"DTMTRX2" ¦
B,1,400,V,100,200,35,29,50,8,L,1 ¦}

{B,36,N,1¦
1,"1234567890ABCDEFGHIJKLMNOPQRST"¦}
```

This example prints a one-inch by a half-inch tall (**50**) rectangular 16 rows by 36 columns (density **29**) Data Matrix symbol rotated 90 (**1**).

Sample Data Matrix with Function 1



```
{F,36,A,R,E,400,400,"DTMTRX1"¦
B,1,50,V,10,50,35,0,50,8,L,0¦}

{B,36,N,1¦
1,"~~110012345678902"¦}
```

This example prints a 0.50-inch wide by 0.50-inch tall (**50**) square Data Matrix symbol using the default density (**0**) without any field rotation (**0**). FNC1 appears in the batch data as **~~1**.

Sample Quick Response Packets

Quick Response (QR Code) is a two-dimensional bar code, which is made up of square modules arranged in an overall square pattern. A unique finder pattern is located at three corners of the symbol. Four levels of error correction are available, along with a wide range of symbol sizes.

Model 1 is the original specification.

Model 2 is an enhanced form that includes additional features.

The maximum number of characters depends on the type of characters entered for the batch data and differs for the two models of QR Code.

Data Type	Model1	Model2
Numeric data	1167	2710
Alphanumeric data	707	2710
8-Bit data	486	2710
Kanji data	299	1817

QR Code can accommodate Japanese *Kana* and *Kanji* characters and has a variety of applications, including marking spark plugs, radiators, printed circuit boards, and test tubes. Refer to the *AIM International Symbology Specification* for more details about data requirements.

Entering Batch Data for QR Code

QR Code requires certain parameters at the beginning of all batch data.

Syntax `"error_cor mask# data_input, char"`

error_cor Level of error correction. Some damaged bar codes may still be scannable if the error correction is high enough. Options:

- **H** Ultra high reliability level
- **Q** High reliability level
- **M** Standard level
- **L** High density level

Note: As you increase the error correction level, the maximum number of characters (in the field) decreases.

mask# Mask number. Undefined. Leave blank or use **0**.

data_input Type of data input. Options:

- **A** Automatic
- **M** Manual

char Type of characters. Options:

- **A** Alphanumeric
- **B** Binary
- **K** Kanji
- **N** Numeric

Note: In binary mode, the number of characters must be represented by the 4-digit number in decimal.

Example

```
1,"HM,N0123456789012345" ¦}
```

Defines the following batch data for the QR Code: The error correction level is **H**, which provides very high reliability. Leave the mask number blank. The data input mode is **M**anual. The type of characters are **N**umeric and the data is **0123456789012345**.

QR Code Packet

```
{F,1,A,R,E,200,200,"QRCODE"  ¦
B,1,200,V,50,50,36,0,100,2,B,0 ¦
{B,1,N,1 ¦
1,"HM,N0123456789012345" ¦ }
```



Structured Append Mode

QR Code offers a mode called structured append (or concatenated) that allows you to collect data from multiple QR Code symbols and use that data elsewhere. For example, the components of a sub-assembly can have individual QR Codes and the QR Code for the entire assembly contains all the data from the individual codes. This mode also requires certain parameters at the beginning of all batch data.

Syntax

```
"mode_id code# #of_div parity, error_cor mask#
data_input char"
```

mode_id Mode identifier. Use **D** to indicate the structured append (or concatenated) mode.

code# Code number of the individual symbol in the concatenated set. You must use a two-digit number in decimal.

#of_div Total number of symbols in this concatenated set. You must use a two-digit number in decimal.

parity Parity byte. You must use a two-digit number in hexadecimal. There is no standard parity byte.

error_cor Level of error correction. Some damaged bar codes may still be scannable if the error correction is high enough. Options:

- **H** Ultra high reliability level
- **Q** High reliability level
- **M** Standard level
- **L** High density level

Note: As you increase the error correction level, the maximum number of characters (in the field) decreases.

mask# Mask number. Undefined. Leave blank or use **0**.

data_input Type of data input. Options:

- **A** Automatic
- **M** Manual

char Type of characters. Options:

- **A** Alphanumeric
- **B** Binary
- **K** Kanji
- **N** Numeric

Note: In binary mode, the number of characters must be represented by the 4-digit number in decimal.

Example

```
1,"D0205E9,Q0A," ¦
C,"B006qrcode," ¦ }
```

Defines the structured append mode (**D**) for QR Code. This is symbol (**02**) of a concatenated set containing (**05**) symbols. The parity byte is **E9**. The error correction level is **Q**, which provides a high reliability. Use **0** for the mask number. The data input mode is **A**utomatic. The type of characters are binary (**B**) and there will be six (**06**) data characters (**qrcode**).

Structured Append QR Code Packet



```
{F,2,A,R,E,200,200,"QRCODE2"  ¦
B,1,200,V,50,50,36,0,100,2,B,0 ¦ }
{B,2,N,1 ¦
1,"D0202E9,Q0A"  ¦
C,"0123456789ABCD+__âôû~129~064~159~252~224~064" ¦ }
```

Sample GS1 DataBar Packet



```
{F,1,A,R,E,400,400,""¦
B,1,30,V,5,5,38,4,0,0,L,0,1,2,22¦}
{B,1,N,1¦
1,"123456|Monarch Brand Printers"¦}
```

Sample GS1 DataBar with Function 1



```
{F,1,A,R,E,400,400,"UCC AB"¦
B,1,30,V,5,65,38,4,35,0,L,0,11,2,22¦}
{B,1,N,1¦
1,"~02910ABC¦~029Monarch Brand Printers"¦}
```

Sample Aztec Packet



```
{F,1,A,R,G,3000,832,"TEST"¦
B,1,2000,V,50,300,37,7,0,0,L,0¦
R,53,0,0,0,1,""¦}
{B,1,N,1¦
1,"Monarch Brand Printers"¦}
```

Sample Compliance Packet

```
{F,1,A,R,E,600,400,"RDCI" ¦
L,V,500,115,90,85,3 ¦
L,V,298,245,90,102,3 ¦
L,V,500,2,0,390,3 ¦
L,V,400,2,0,390,3 ¦
L,V,298,2,0,390,3 ¦
L,V,200,2,0,390,5 ¦
C,568,8,0,2,2,2,B,L,0,0,"FROM:",0 ¦
C,568,125,0,2,2,2,B,L,0,0,"CARRIER:",0 ¦
C,529,124,0,2,2,2,B,L,0,0,"PRO NUMBER:",0 ¦
C,511,125,0,2,2,2,B,L,0,0,"B/L NUMBER:",0 ¦
C,472,8,0,2,2,2,B,L,0,0,"TO:",0 ¦
C,387,8,0,2,1,1,B,L,0,0,"(420) SHIP TO POSTAL CODE",0 ¦
C,391,250,0,2,1,1,B,L,0,0,"APPOINTMENT NUMBER:",0 ¦
C,358,250,0,2,1,1,B,L,0,0,"ORDER TYPE:",0 ¦
C,327,250,0,2,1,1,B,L,0,0,"ITEM:",0 ¦
C,190,8,0,2,1,1,B,L,0,0,"UPC SHIPPING CONTAINER CODE",0 ¦
C,557,6,0,2,1,1,B,L,0,0,"MONARCH",0 ¦
C,547,6,0,2,1,1,B,L,0,0,"170 MONARCH LANE",0 ¦
C,537,6,0,2,1,1,B,L,0,0,"P.O. BOX 608",0 ¦
C,527,6,0,2,1,1,B,L,0,0,"DAYTON, OHIO  45401",0 ¦
C,462,313,0,2,4,3,B,L,0,0,"#",0 ¦
T,1,15,V,529,220,0,2,2,2,B,L,0,0,0 ¦
T,2,15,V,511,220,0,2,2,2,B,L,0,0,0 ¦
B,3,13,V,311,28,8,4,50,8,L,0 ¦
B,4,14,V,17,60,50,5,130,8,L,0 ¦
T,5,30,V,161,080,0,3,1,1,B,L,0,0,0 ¦
T,6,15,V,467,40,4,1,2,2,B,L,0,0,0 ¦
T,7,10,V,462,330,6,2,4,3,B,L,0,0,0 ¦
T,8,20,V,549,124,0,2,2,2,B,L,0,0,0 ¦
T,9,30,V,446,40,4,2,2,2,B,L,0,0,0 ¦
T,10,30,V,426,40,4,2,2,2,B,L,0,0,0 ¦
T,11,30,V,406,40,4,2,2,2,B,L,0,0,0 ¦
T,12,20,V,368,255,0,2,3,2,B,L,0,0,0 ¦
T,13,5,V,335,270,0,2,3,2,B,L,0,0,0 ¦
T,14,15,V,304,270,0,2,3,2,B,L,0,0,0 ¦
T,15,15,V,366,65,0,2,2,2,B,L,0,0,0 ¦
R,1,"(420)ÿ" ¦
T,16,27,V,270,10,0,3,1,1,B,C,0,0,0 ¦
T,17,27,V,240,10,0,3,1,1,B,C,0,0,0 ¦
R,1,"WELCOMES GUEST # " ¦
T,18,27,V,210,10,0,3,1,1,B,C,0,0,0 ¦ }
```

Sample Batch Packet

```
{B,1,N,1 ¦
1,"1234567890" ¦
2,"0987654321" ¦
3,"~20142032678" ¦
4,"10028028662854" ¦
5,"1 00 28028 66285 4" ¦
6,"RODGER DIST CTR" ¦
7,"8292" ¦
8,"BROADWAY" ¦
9,"555 WEST OAK AVE." ¦
10,"DAYTON, OH  45401-0608" ¦
11,"" ¦
12,"08292 123456-123" ¦
13,"AR" ¦
14,"999-999999-99" ¦
15,"32678" ¦
16,"WYSIWYG" ¦
17,"99999" ¦
18,"TO A PRODUCT DEMO" ¦ }
```

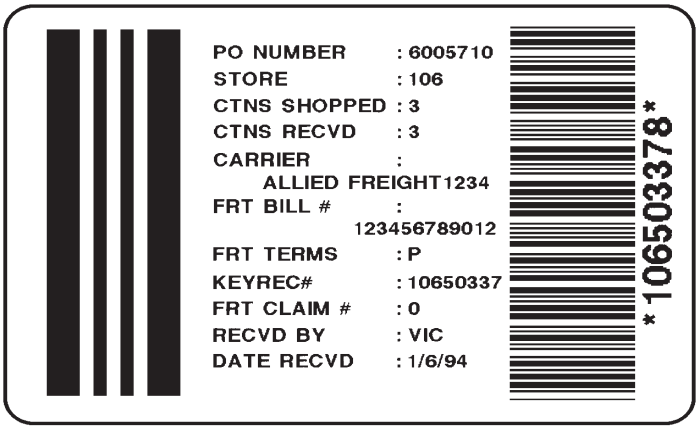

FROM:
MONARCH
170 MONARCH LANE
P.O. BOX 608
DAYTON, OHIO 45401
CARRIER:
BROADWAY
PRO NUMBER: 1234567890
B/L NUMBER: 0987654321
TO: RODGER DIST CTR #8292
555 WEST OAK AVE.
DAYTON, OH 45401-0608
(420) SHIP TO POSTAL CODE
(420)32678
APPOINTMENT NUMBER:
08292 123456-123
ORDER TYPE:
AR
ITEM:
999-999999-99
WYSIWYG
WELCOMES GUEST #99999
TO A PRODUCT DEMO
UPC SHIPPING CONTAINER CODE
1 00 28028 66285 4

Sample Format Packet

```
{F,5,A,R,G,576,768,"1HDREC1" ¦
L,S,19,39,499,39,38,"" ¦
L,S,19,93,499,93,15,"" ¦
L,S,19,124,499,124,15,"" ¦
L,S,19,155,499,155,38,"" ¦
C,461,232,0,1,1,1,B,L,0,0,"PO NUMBER   ",1 ¦
C,426,232,0,1,1,1,B,L,0,0,”STORE       " ¦
C,391,232,0,1,1,1,B,L,0,0,”CTNS SHOPPED" ¦
C,357,232,0,1,1,1,B,L,0,0,"CTNS RECVD  " ¦
C,320,232,0,1,1,1,B,L,0,0,”CARRIER    " ¦
C,259,232,0,1,1,1,B,L,0,0,”FRT BILL #  " ¦
C,196,232,0,1,1,1,B,L,0,0,”FRT TERMS   " ¦
C,159,232,0,1,1,1,B,L,0,0,”KEYREC#     " ¦
C,125,232,0,1,1,1,B,L,0,0,”FRT CLAIM # " ¦
C,090,232,0,1,1,1,B,L,0,0,”RECVD BY    " ¦
C,056,232,0,1,1,1,B,L,0,0,”DATE RECVD  " ¦
C,461,445,0,1,1,1,B,L,0,0,”:" ¦
C,426,445,0,1,1,1,B,L,0,0,":" ¦
C,391,445,0,1,1,1,B,L,0,0,":" ¦
C,357,445,0,1,1,1,B,L,0,0,":" ¦
C,320,445,0,1,1,1,B,L,0,0,":" ¦
C,259,445,0,1,1,1,B,L,0,0,":" ¦
C,196,445,0,1,1,1,B,L,0,0,":" ¦
C,159,445,0,1,1,1,B,L,0,0,":" ¦
C,125,445,0,1,1,1,B,L,0,0,":" ¦
C,090,445,0,1,1,1,B,L,0,0,":" ¦
C,056,445,0,1,1,1,B,L,0,0,":" ¦
T,01,08,V,461,458,0,1,1,1,B,L,0,0 ¦
T,02,08,V,426,458,0,1,1,1,B,L,0,0 ¦
T,03,08,V,391,458,0,1,1,1,B,L,0,0 ¦
T,04,08,V,357,458,0,1,1,1,B,L,0,0 ¦
T,05,18,V,290,289,0,1,1,1,B,R,0,0 ¦
T,06,12,V,230,395,0,1,1,1,B,R,0,0 ¦
T,07,08,V,196,458,0,1,1,1,B,L,0,0 ¦
T,08,08,V,159,458,0,1,1,1,B,L,0,0 ¦
T,09,08,V,125,458,0,1,1,1,B,L,0,0 ¦
T,10,08,V,090,458,0,1,1,1,B,L,0,0 ¦
T,11,08,V,056,458,0,1,1,1,B,L,0,0 ¦
T,12,11,V,259,762,0,1,2,2,B,B,0,1 ¦
R,1,"*_________*" ¦
B,13,09,V,259,720,4,4,145,8,B,1 ¦
R,4,12,2,9,1,1 ¦
R,50,3,8 ¦ }
```

Sample Zero Batch Packet

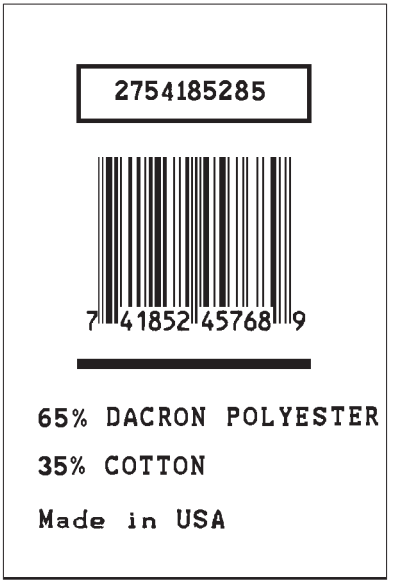
```
{B,5,N,0 ¦ }
{B,5,U,1 ¦
1,"6005710" ¦
2,"106" ¦
3,"3" ¦
4,"3" ¦
5,"ALLIED FREIGHT1234" ¦
6,"123456789012" ¦
7,"P" ¦
8,"10650337" ¦
9,"0" ¦
10,"VIC" ¦
11,"1/6/94" ¦
12,"106503378" ¦ }
```



Sample Data Entry Format Packet

This packet uses Option 5 (Data Entry Sources) and Option 20 (Data Entry Prompts). After the printer receives the format packet, the operator can go into Batch Entry Mode at the printer and enter the batch data.

```
{F,1,A,R,E,300,200,"TEXTILES" ¦
T,1,10,V,250,50,0,1,1,1,B,C,0,0,0 ¦
  R,20,"PART NUMBER:" ¦
  R,5,K ¦
B,2,12,V,150,40,1,2,80,7,L,0 ¦
  R,20,"UPC NUMBER:" ¦
  R,5,K ¦
D,3,20 ¦
  R,20,"FIBER#1:" ¦
  R,5,K ¦
D,4,3 ¦
  R,20,"PERCENTAGE:" ¦
  R,5,K ¦
T,5,30,V,80,10,0,1,1,1,B,L,0,0,0 ¦
  R,1,"   %                    " ¦
  R,4,3,1,20,5,1 ¦
  R,4,4,1,3,1,1 ¦
  R,5,N ¦
D,6,20 ¦
  R,20,”FIBER #2:" ¦
  R,5,K ¦
D,7,3 ¦
  R,20,"PERCENTAGE:" ¦
  R,5,K ¦
T,8,30,V,65,10,0,1,1,1,B,L,0,0,0 ¦
  R,1,"   %                    " ¦
  R,4,6,1,20,5,1 ¦
  R,4,7,1,3,1,1 ¦
  R,5,N ¦
C,30,10,0,1,1,1,B,L,0,0,”MADE IN USA",0 ¦
L,S,110,30,110,150,10," " ¦
Q,240,30,270,150,3," " ¦ }
```



Depending on the operator-entered batch data, a label similar to this one prints.

RFID Data Field Samples

The ellipsis indicate additional fields that are not shown.

RFID Data Field with a Copy Option

```
{F,1,A,R,E,600,400,"RDCI" ¦
L,V,500,115,90,85,3 ¦
L,V,298,245,90,102,3 ¦
C,568,8,0,2,2,2,B,L,0,0,"FROM:",0 ¦
C,568,125,0,2,2,2,B,L,0,0,"CARRIER:",0 ¦
C,387,8,0,2,1,1,B,L,0,0,"(420) SHIP TO POSTAL CODE",0 ¦
C,391,250,0,2,1,1,B,L,0,0,"APPOINTMENT NUMBER:",0 ¦
C,327,250,0,2,1,1,B,L,0,0,"ITEM:",0 ¦
C,190,8,0,2,1,1,B,L,0,0,"UPC SHIPPING CONTAINER CODE",0 ¦
T,1,15,V,529,220,0,2,2,2,B,L,0,0,0 ¦
B,3,13,V,311,28,8,4,50,8,L,0 ¦
B,4,14,V,17,60,50,5,130,8,L,0 ¦
X,5,24,0 ¦
T,6,20,V,415,270,0,50,15,15,B,L,0,2 ¦
R,4,5,1,16,1,0 ¦
...}
```

Sample Batch Packet

```
{B,1,N,1 ¦
1,"RFID TEST" ¦
3,"1005678" ¦
4,"67-90-32" ¦
5,"3123456789ABCDEF12345678" ¦
6,"ABCDEFG" ¦
...}
```

The RFID Data Field contains exactly 24 characters of data in ASCII Hex format for a 96-bit RFID tag.

96-Bit RFID Data Field Samples

The following examples can be used for C1Gen1 and C1Gen2 (without locking).

The 96-bit data that can be displayed using the printer's Setup, RFID menu for all these examples is the same: "313233343536373839303132." Refer to your *RFID Multi-Protocol Application Notes* for more information about displaying what is programmed into an RFID tag.

ASCII HEX Sample

```
{F,2,A,R,E,400,400,"ASCIIHEX" ¦
T,1,50,V,10,10,0,1,1,1,B,L,0,0 ¦
X,2,24,0 ¦ }

{B,2,N,2 ¦
1,"313233343536373839303132" ¦
2,"313233343536373839303132" ¦ }
```

ASCII Hex data type is selected in the RFID Data Field and the batch data is entered as ASCII Hex.

ASCII Sample

```
{F,2,A,R,E,400,400,"ASCII" ¦
T,1,50,V,10,10,0,1,1,1,B,L,0,0 ¦
X,2,12,1 ¦ }

{B,2,N,1 ¦
1,"123456789012" ¦
2,"123456789012" ¦ }
```

ASCII data type is selected in the RFID Data Field and the batch data is entered as ASCII.

ASCII BINARY Sample

```
{F,2,A,R,E,400,400,"ASCIIBIN" ¦
T,1,96,V,10,10,0,2,1,1,B,L,0,0 ¦
X,2,96,2 ¦ }

{B,2,N,1 ¦
1,"00110001001100100011001100110100001101010011011000110111
00111000001100010011001000110011001100110100" ¦
2,"00110001001100100011001100110100001101010011011000110111
00111000001100010011001000110011001100110100" ¦ }
```

Note: The ASCII Binary data needs to be entered on one line. Do not use line breaks to wrap the data. This data is shown on several lines because of the font size and margins.

ASCII Binary data type is selected in the RFID Data Field and the batch data is entered as ASCII Binary.

HEX Sample

```
{F,2,A,R,E,400,400,"HEX" ¦
T,1,50,V,10,10,0,1,1,1,B,L,0,0 ¦
X,2,12,3 ¦ }

{B,2,N,1 ¦
1,"~049~050~051~052~053~054~055~056~057~048~049~050" ¦
2,"~049~050~051~052~053~054~055~056~057~048~049~050" ¦}
```

Hex data type is selected in the RFID Data Field and the batch data is entered as Hex.

Note: Tilde numbers are decimal **0** to **255**, which is how Hex values must be entered.

SSCC96 Sample

```
{F,45,A,R,E,600,400,"SSCC96" ¦
C,45,220,0,50,10,10,B,L,0,2,"_"  ¦
C,75,385,0,50,40,30,B,L,0,2,"Monarch RFID" ¦
C,110,385,0,50,6,6,B,L,0,2,"SHIP TO RFID USER" ¦
C,110,150,0,50,6,6,B,L,0,2,"CARRIER" ¦
C,150,150,0,50,9,9,B,L,0,2,"PRO:"  ¦
C,165,150,0,50,9,9,B,L,0,2,"B/L:"  ¦
C,200,380,0,50,18,15,B,L,0,2,"PAXAR AMERICAS, Inc."  ¦
C,235,380,0,50,14,12,B,L,0,2,"EMAIL: RFID@PAXAR.COM" ¦
C,255,380,0,50,14,12,B,L,0,2,"PHONE: 1 800 543-6650" ¦
C,275,345,0,50,6,6,B,L,0,2,"VENDOR STK NO:"  ¦
C,275,110,0,50,6,6,B,L,0,2,"PACK/UNITS:"  ¦
C,360,330,0,50,10,10,B,L,0,2,"EPC Pure Identity:"  ¦
C,275,190,0,50,6,6,B,L,0,2,"COLOR:"  ¦
C,315,110,0,50,6,6,B,L,0,2,"SIZE/STYLE:"  ¦
C,415,390,0,50,12,12,B,L,0,2,"EPC#:" ¦
L,S,098,005,098,395,6,""  ¦
L,S,170,005,170,395,6,""  ¦
L,S,098,155,170,155,6,""  ¦
L,S,260,005,260,395,6,""  ¦
L,S,390,005,390,395,6,""  ¦
T,1,15,V,130,335,0,50,13,12,B,L,0,2 ¦
B,2,15,V,165,365,8,4,25,0,L,2 ¦
T,3,20,V,130,150,0,50,13,12,B,L,0,2 ¦
T,4,20,V,150,110,0,50,10,12,B,L,0,2 ¦
T,5,20,V,165,110,0,50,10,12,B,L,0,2 ¦
T,12,10,V,295,370,0,50,15,18,B,L,0,2 ¦
T,13,10,V,295,110,0,50,15,18,B,L,0,2 ¦
T,14,50,V,380,385,0,50,12,11,B,L,0,2 ¦
T,15,10,V,295,200,0,50,15,18,B,L,0,2 ¦
T,16,10,V,335,155,0,50,15,18,B,L,0,2 ¦
T,18,30,V,550,330,0,50,15,18,B,L,0,2 ¦
B,17,20,V,530,340,50,6,110,0,L,2 ¦
X,19,24 ¦
T,20,40,V,415,330,0,50,12,13,B,L,0,2 ¦
R,4,19,1,40,1,1 ¦ }
```

Sample Batch Packet

```
{B,45,N,1 ¦
1,"VENDOR USA" ¦
2,"42060512" ¦
3,"PAXAR AMERICAS" ¦
4,"0987764356" ¦
5,"0020545640" ¦
12,"0075687332" ¦
13,"3600" ¦
14,"urn:epc:tag:sscc-96:1.0028028.0000001235" ¦
15,"RED" ¦
16,"48~"/TOUGH" ¦
17,"009280287586887" ¦
18,"0  09  28028  75688  7" ¦
19,"313401B5F0000004D3000000" ¦
20,"0" ¦ }
```

SGTIN 96 Sample

```
{F,46,A,R,E,600,400,"SGTIN96" ¦
C,45,220,0,50,10,10,B,L,0,2,"_" ¦
C,75,385,0,50,40,30,B,L,0,2,"Monarch RFID" ¦
C,110,385,0,50,6,6,B,L,0,2,"SHIP TO RFID USER" ¦
C,110,150,0,50,6,6,B,L,0,2,"CARRIER" ¦
C,150,150,0,50,9,9,B,L,0,2,"PRO:"  ¦
C,165,150,0,50,9, 9,B,L,0,2,"B/L:"  ¦
C,200,380,0,50,18,15,B,L,0,2,"PAXAR AMERICAS, Inc."  ¦
C,235,380,0,50,14,12,B,L,0,2,"EMAIL: RFID@PAXAR.COM" ¦
C,255,380,0,50,14,12,B,L,0,2,"PHONE: 1 800 543-6650" ¦
C,275,345,0,50,6,6,B,L,0,2,"VENDOR STK NO:" ¦
C,275,110,0,50,6,6,B,L,0,2,"PACK/UNITS:" ¦
C,360,330,0,50,10,10,B,L,0,2,"EPC Pure Identity:" ¦
C,275,190,0,50,6,6,B,L,0,2,"COLOR:" ¦
C,315,110,0,50,6,6,B,L,0,2,"SIZE/STYLE:" ¦
C,415,390,0,50,12,12,B,L,0,2,"EPC#:" ¦
L,S,098,005,098,395,6,"" ¦
L,S,170,005,170,395,6,"" ¦
L,S,098,155,170,155,6,"" ¦
L,S,260,005,260,395,6,"" ¦
L,S,390,005,390,395,6,"" ¦
T,1,15,V,130,335,0,50,13,12,B,L,0,2 ¦
B,2,15,V,165,365,8,4,25,0,L,2 ¦
T,3,20,V,130,150,0,50,13,12,B,L,0,2 ¦
T,4,20,V,150,110,0,50,10,12,B,L,0,2 ¦
T,5,20,V,165,110,0,50,10,12,B,L,0,2 ¦
T,12,10,V,295,370,0,50,15,18,B,L,0,2 ¦
T,13,10,V,295,110,0,50,15,18,B,L,0,2 ¦
T,14,50,V,380,385,0,50,12,11,B,L,0,2 ¦
T,15,10,V,295,200,0,50,15,18,B,L,0,2 ¦
T,16,10,V,335,155,0,50,15,18,B,L,0,2 ¦
T,18,30,V,550,330,0,50,15,18,B,L,0,2 ¦
B,17,20,V,530,340,50,6,110,0,L,2 ¦
X,19,24 ¦
T,20,40,V,415,330,0,50,12,13,B,L,0,2 ¦
R,4,19,1,40,1,1 ¦ }
```

Sample Batch Packet

```
{B,46,N,1 ¦
1,"VENDOR USA" ¦
2,"42060512" ¦
3,"PAXAR AMERICAS" ¦
4,"0987764356" ¦
5,"0020545640" ¦
12,"0075687332" ¦
13,"3600" ¦
14,"urn:epc:tag:sgtin-96:1.0028028.001234.2" ¦
15,"RED" ¦
16,"48~"/TOUGH" ¦
17,"009280287586887" ¦
18,"0  09  28028  75688  7" ¦
19,"303401B5F001348000000002" ¦
20,"0" ¦ }
```

Expanded C1Gen2 Samples

Password Lock

```
{F,2,A,R,E,400,400,"PWDLOCK" ¦
X,1,100,0 ¦ }
{B,2,N,1 ¦
1,"3132333435363738313233334~028" ¦
C,"ABCDEFGH01234567UserMemorySample~028" ¦
C,"~028" ¦
C,"73737373~028" ¦
C,"CAD01234~028" ¦
C,"22022" ¦ }
```

The EPC data is 313233343536373831323334, the user memory data is ABCDEFGH01234567UserMemorySample, the access password is 73737373, and the kill password is CAD01234. Selects password lock (2) as the locking method for the EPC, user memory, access, and kill fields. To change the EPC, user memory, or kill fields, the access password must be sent with the batch data.

Permalock and Password Lock

```
{F,2,A,R,E,400,400,"BOTHLOCK" ¦
X,1,100,0 ¦ }
{B,2,N,1 ¦
1,"3132333435363738313233334~028" ¦
C,"~028" ¦
C,"~028" ¦
C,"73737373~028" ¦
C,"CAD01234~028" ¦
C,"30033" ¦ }
```

The EPC data is 313233343536373831323334, the access password is 73737373, and the kill password is CAD01234. Selects permalock and password lock (3) as the locking method for the EPC, access, and kill fields, which means these fields are permanently un-writable. The EPC data can only be programmed ONE time.

FONTS

B

Our printers support two types of fonts: Bitmapped (traditional printer fonts such as Standard and Reduced) and Scalable/TrueType® (Font 50). This appendix gives a brief overview of each type of font and how your printer interprets fonts. It also shows examples of the fonts loaded in your printer.

Number	Font Size and Appearance	Type of Spacing	# of Dots Between Characters
1	Standard	monospaced	3 (203 dpi) 5 (300 dpi)
2	Reduced	monospaced	1 (203 dpi) 2 (300 dpi)
3	Bold	monospaced	3 (203 dpi) 5 (300 dpi)
4	OCRA-like	monospaced	3 (203 dpi) 5 (300 dpi)
5	HR1 - only for numeric data	monospaced	2 (203 dpi) 3 (300 dpi)
6	HR2 - only for numeric data	monospaced	1 (203 dpi) 2 (300 dpi)
10	CG Triumvirate™ Typeface Bold (9 pt. at 203 dpi or 8 pt. at 300 dpi)	proportional	varies w/ each letter
11	6 pt. CG Triumvirate™ Typeface	proportional	varies w/ each letter
15	7 pt. CG Triumvirate™ Typeface	proportional	varies w/ each letter
16	9 pt. CG Triumvirate™ Typeface	proportional	varies w/each letter
17	11 pt. CG Triumvirate™ Typeface	proportional	varies w/each letter
18	15 pt. CG Triumvirate™ Typeface	proportional	varies w/each letter
50	EFF Swiss Bold	scalable	varies w/each letter
56	PaxarSymbols	proportional	varies w/each letter
70	15 pt. Paxar	proportional	varies w/each letter
71	18 pt. Paxar	proportional	varies w/each letter
72	15 pt. NAFTA	proportional	varies w/each letter
73	18 pt. NAFTA	proportional	varies w/each letter

* The CG Triumvirate™ typefaces support only ANSI and DOS Code Page 437 and 850 Symbol Sets. The scalable font does not support Code Page 1256 (Arabic). The Euro-dollar symbol at position ~192 is only available in the Standard, Reduced, and Bold fonts.

These samples were printed using the Internal Symbol set.

Standard Font



Reduced Font



Bold Font



OCRA-like Font



EFF Swiss Bold Font*

ABCDEFGHIJKLM
NOPQRSTUVWXYZ
abcdefghijklm
nopqrstuvwxyz
0123456789:;<=>?
@!"#$%&'()*+,-./
[\]^_`{|}~€ ,
ƒ„…†‡ˆ‰Š‹Œ Ž
‘’“”•—˜™š›œ
žŸ ¡¢£¤¥¦§¨©
ª«¬-®¯°±²³´µ¶
·¸¹º»¼½¾¿ÀÁÂÃ
ÄÅÆÇÈÉÊËÌÍÎÐ
ÑÒÓÔÕÖ×ØÙÚÛÜÝ
Þßàáâãäåæçèéê
ëìíîðñòóôõö÷
øùúûüýþÿ

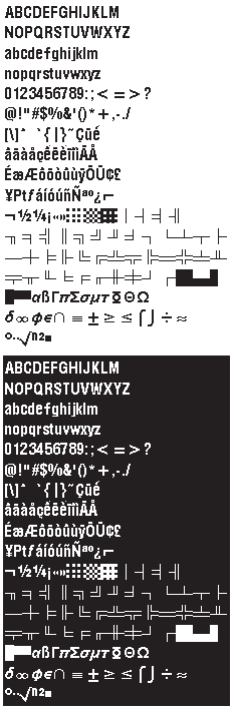
* Printed with ANSI Symbol Set

These samples were printed using Code Page 437.

CG Triumvirate™ Typeface Bold



CG Triumvirate™ Typeface



PaxarSymbols Font 56 Characters

A (decimal 65) = 

Paxar Font 70 and Font 71 Characters

32	33	34	35	36	37	38	39
							
40	41	42	43	44	45	46	47
							
48	49	50	51	52	53	54	55
							
56	57	58	59	60	61	62	63
							
64	65	66	67	68	69	70	71
							
72	73	74	75	76	77	78	79
							
80	81	82	83	84	85	86	87
							

NAFTA Font 72 and Font 73 Characters

32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
							
48	49	50	51	52	53	54	55
							
56	57	58	59	60	61	62	63
							
64	65	66	67	68	69	70	71
							
72	73	74	75	76	77	78	79
							
80	81	82	83	84	85	86	87
							
88	89	90	91	92	93	94	95
							
96	97	98	99	100	101	102	103
							
104	105	106	107	108	109		
							

Bitmap Font Information

Our bitmap fonts are either monospaced (each character occupies the same amount of space) or proportional (each character is a different width). Use monospaced fonts for price fields and data you want to list in a column. With proportionally spaced fonts, you may be able to place more characters on a line. However, you may need to experiment with these fonts and adjust field measurements in your format. The bitmapped fonts (either monospaced or proportional) appear jagged when magnified. The magnification range is **1** to **7**.

Use the MONARCH® MPCL™ Toolbox (Soft Font Utility), available on our Web site, to convert a bitmap font to Hex or Run-Length encoding for the printer. Select the point size and characters to print. Bitmap fonts may image faster than a TrueType font, but you are limited to the point size and characters you downloaded.

Monospaced Font Magnification

Monospaced characters occupy the same amount of space within a magnification. Use monospaced fonts for price fields and data you want to list in a column. Decide how wide and tall you want the characters to appear on the labels. The following two tables show the width and height of each of the monospaced fonts after magnification.

This table includes the default (3 dots for Standard, 1 dot for Reduced, 3 dots for Bold) spacing.

Using 203 DPI

Width Mag.	Units	Standard Character Width	Standard Sample	Reduced Character Width	Reduced Sample	Bold Character Width	Bold Sample
1x	1/100 in.	8.37		3.9		13.3	
	1/10 mm	21.26		9.9		33.78	
	Dots	17	A	8	A	27	A
7x	1/100 in.	49.75		24.63		84.24	
	1/10 mm	126.37		62.56		214	
	Dots	101		50		171	

Using 300 DPI

Width Mag.	Units	Standard Character Width	Standard Sample	Reduced Character Width	Reduced Sample	Bold Character Width	Bold Sample
1x	1/100 in.	8.7		4		13.7	
	1/10 mm	22		10.2		34.7	
	Dots	26	A	12	A	41	A
7x	1/100 in.	50.7		25		85.7	
	1/10 mm	128.7		63.5		217.6	
	Dots	152		75		257	

Only the 1x width can be scanned with the OCRA-like font. Using a printhead with 203 dpi, the character widths are as follows: 7.9 (English), 20.1 (Metric), and 16 (Dots).

To calculate other font widths, multiply the font dots (14 dots for Standard, 7 dots for Reduced, 24 dots for Bold) by the magnification and add the default spacing (3 dots for Standard, 1 dot for Reduced, 3 dots for Bold) between characters.

Example

14 (Standard font dots) x 5 (magnification) = 70 + 3 (default spacing between characters). There are 73 dots in the Standard font at 5x.

203 DPI Height Magnification

Standard	1x A	7x 
1/100 in.	10.8	75.9
1/10 mm	27.4	192.8
dots	22	154

Reduced		
1/100 in.	6.9	48.28
1/10 mm	17.5	122.6
dots	14	98



Bold

1/100 in.	16.7	117.24
1/10 mm	42.4	297.8
dots	34	238

OCRA-like (1x only)

1/100 in.	11.8
1/10 mm	30
dots	24



1x 7x

300 DPI Height Magnification



Standard

1/100 in.	11	77
1/10 mm	28	195.6
dots	33	231



Reduced

1/100 in.	7	49
1/10 mm	17.8	124.5
dots	21	147



Bold

1/100 in.	18.7	130.7
1/10 mm	47.4	332
dots	56	392

OCRA-like (1x only)

1/100 in.	12
1/10 mm	30.5
dots	36

A

Proportional Font Magnification

Each character in a proportionally spaced font is a different height and width. You may be able to place more characters on a line using proportionally spaced fonts. You may want to experiment with these fonts and adjust field measurements in your format as needed. The bitmapped fonts (either monospaced or proportional) appear jagged when magnified. The magnification range is **1** to **7**. The following tables provide height and width magnification of sample characters.

CG Triumvirate™ Typeface Bold (9 pt.) 203 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1.48	6.4	10.8
	1/10 mm	3.76 i	16.26 L	27.4 W
	Dots	3	13	22
7x	1/100 in.	10.3	44.8	75.9
	1/10 mm	26.2	114	192.8
	Dots	21	91	154

To calculate other font widths, multiply the font dots (3 dots for Minimum, 13 dots for Average, 22 dots for Maximum) by the magnification.

Example

13 (Average font dots) x 5 (magnification) = 65 dots in an average letter of the CG Triumvirate™ Typeface Bold at 5x.

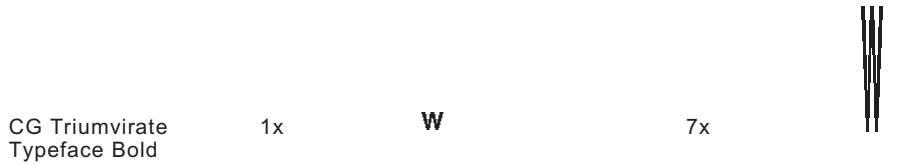
Height Magnification 203 DPI

CG Triumvirate Typeface Bold	1x W	7x
1/100 in.	8.87	56
1/10 mm	22.5	158
dots	18	126

CG Triumvirate™ Typeface Bold (9 pt.) 300 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1.5	8	11
	1/10 mm	3.8	20.3	28
	Dots	4.5	24	331
7x	1/100 in.	10.5	56	77
	1/10 mm	26.7	142.2	195.6
	Dots	31.5	168	231

Height Magnification



1/100 in.	9	63
1/10 mm	22.9	160.2
dots	27	189

CG Triumvirate Typeface (6 pt.) 203 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	.99	2.96	5.9
	1/10 mm	2.51	7.52	15
	Dots	2	6	12
7x	1/100 in.	6.9	20.7	41.4
	1/10 mm	17.5	52.6	105.2
	Dots	14	42	84

Height Magnification 203 DPI





CG Triumvirate Typeface	1x	7x
1/100 in.	5.9	41.38
1/10 mm	14.99	105.1
dots	12	84

CG Triumvirate Typeface (6 pt.) 300 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1	3	6
	1/10 mm	2.54	7.62	15.2
	Dots	3	9	18
7x	1/100 in.	7	21	42
	1/10 mm	17.8	53.3	106.7
	Dots	21	63	126

Height Magnification 300 DPI

CG Triumvirate Typeface	1x	7x
1/100 in.	6.7	46.7
1/10 mm	16.9	118.5
dots	20	140

CG Triumvirate Typeface (7 pt.) 203 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	.99	2.96	5.9
	1/10 mm	2.51	7.52	15
	Dots	2	6	12
7x	1/100 in.	6.9	20.7	41.4
	1/10 mm	17.5	52.6	105.2
	Dots	14	42	84

Height Magnification 203 DPI



CG Triumvirate Typeface	1x	7x
1/100 in.	8.87	56
1/10 mm	22.5	158
dots	18	126

CG Triumvirate Typeface (7 pt.) 300 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1	3	7.3
	1/10 mm	2.54	7.62	18.6
	Dots	3	9	22
7x	1/100 in.	9	21	51.3
	1/10 mm	22.9	53.3	130.4
	Dots	27	63	154

Height Magnification 300 DPI

CG Triumvirate Typeface	1x	7x
1/100 in.	9	63
1/10 mm	22.9	160.2
dots	27	189

CG Triumvirate Typeface (9 pt.) 203 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	.99	2.96	5.9
	1/10 mm	2.51 i	7.52 L	15 W
	Dots	2	6	12
7x	1/100 in.	6.9	20.7	41.4
	1/10 mm	17.5	52.6	105.2
	Dots	14	42	84







Height Magnification 203 DPI



CG Triumvirate Typeface	1x W	7x
1/100 in.	8.87	68
1/10 mm	22.5	172.7
dots	18	138

CG Triumvirate Typeface (9 pt.) 300 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1.3	4.7	9.6
	1/10 mm	3.4	11.8	24.5
	Dots	4	14	29
7x	1/100 in.	9.3	32.7	67.7
	1/10 mm	23.7	83	171.8
	Dots	28	98	203



Height Magnification 300 DPI



CG Triumvirate Typeface	1x	7x
1/100 in.	10.7	74.7
1/10 mm	27.1	189.6
dots	32	224

CG Triumvirate Typeface (11 pt.) 203 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	.99	2.96	5.9
	1/10 mm	2.51 i	7.52 L	15 W
	Dots	2	6	12
7x	1/100 in.	6.9	20.7	41.4
	1/10 mm	17.5	52.6	105.2
	Dots	14	42	84

Height Magnification 203 DPI

CG Triumvirate Typeface 1x W 7x



1/100 in.	8.87	68
1/10 mm	22.5	172.7
dots	18	138

CG Triumvirate Typeface (11 pt.) 300 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	1.7	5.3	10.7
	1/10 mm	4.2	13.5	27.1
	Dots	5	16	32
7x	1/100 in.	11.7	37.3	74.7
	1/10 mm	29.6	94.8	189.6
	Dots	35	112	224

Height Magnification 300 DPI

CG Triumvirate Typeface	1x	7x
1/100 in.	11.7	81.7
1/10 mm	29.6	207.4
dots	35	245

CG Triumvirate Typeface (15 pt.) 203 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	.99	2.96	5.9
	1/10 mm	2.51	7.52	15
	Dots	2	6	12
7x	1/100 in.	6.9	20.7	41.4
	1/10 mm	17.5	52.6	105.2
	Dots	14	42	84



Height Magnification 203 DPI



CG Triumvirate Typeface



1/100 in.	8.87	68
1/10 mm	22.5	172.7
dots	18	138

CG Triumvirate Typeface (15 pt.) 300 DPI

Width Mag.		Minimum	Average	Maximum
1x	1/100 in.	2	7.6	15.7
	1/10 mm	5.1	19.4	39.8
	Dots	6	23	47
7x	1/100 in.	14	53.7	47
	1/10 mm	35.5	136.3	119.4
	Dots	42	161	141

Height Magnification 300 DPI



CG Triumvirate Typeface	1x	7x
1/100 in.	17.7	8123.7
1/10 mm	44.8	314.1
dots	53	371

Scalable Font Information

The scalable font is smooth at any point size. There are no jagged edges because the font is created from an equation every time it is used. The field width varies with each letter.

When you define formats using scalable fonts, remember to set the character rotation to **0**, because it is not supported. However, field rotation is supported for text or constant text fields using the scalable font. **The scalable font does not print a slashed zero.**

Scalable fonts perform better in constant text fields, because those fields are imaged only once per batch, not once per label as in text fields. The transparent overlay allows closer field placement when using scalable fonts.

To use large point sizes (greater than 60), you must reconfigure memory and increase the size of the scalable (vector) fonts buffer.

The height and width magnification are defined in point size.
72 points = one inch. One inch = cell size. The cell size is the built-in space around the individual characters of the scalable font. The point size range is **4** to **255**. If the height and width are not set to the same point size, the printed characters look tall and thin or short and thick, which allows for greater flexibility in the appearance of the font.

The 72 point EFF Swiss Bold sample shows the one inch cell size.



TrueType Font Information

TrueType fonts follow the TrueType outline font standard. These fonts are smooth at any point size. There are no jagged edges, because the font is created from an equation every time it is used. The height and width magnification are defined in point size. 72 points = one inch.
One inch = cell size. The cell size is the built-in space around the individual characters of the scalable font. The point size range is **4** to **255**. The field width varies with each letter. The printer can accept downloaded TrueType fonts.

Downloading TrueType Fonts

The MONARCH® MPCL™ Toolbox (Font Utility) is available on our Web site and converts TrueType fonts to Hex or Run-Length encoding for the printer.

When downloading a TrueType font, you download the entire font, not particular characters or one point size. You can print a variety of symbol sets with International (Turkish, Latin, Spanish, etc.) characters. TrueType fonts are designed to be regionally specific; therefore, all symbol sets may not be supported in a given font.

These font files are large and may image slower than bitmap fonts. The size of the font file, in bytes, is the minimum amount of memory you must have available for fonts in the printer's downloadable fonts buffer.

You may need to reallocate memory to use downloaded TrueType fonts. After reallocating memory, resend the font, format, and batch packets. See "Defining the Memory Configuration Packet" in Chapter 2 for more information. Also, Chapter 2 lists some special considerations when defining memory for downloaded TrueType fonts.

Using International Fonts

International fonts are available as bitmap or TrueType fonts. See "Bitmap Font Information" or "TrueType Font Information" for more details. To use these fonts, you must purchase the memory expansion option and download the font to the printer.

Version 6.0 or greater (9855/9860) and version 3.0 or greater (9825) have a new font rasterizer, which allows for an additional symbol set (110 – Unicode UTF-8). To use this symbol set, you must download an International TrueType font. An International TrueType font containing Chinese or Japanese characters *requires* the high memory option (purchased separately). The high memory option is only available with the 9855/9860 printers. An International TrueType font containing Arabic characters may *not* require the high memory option.

Note: Because the 9825 printer's memory is limited, only Latin fonts (smaller than 256K) may fit in the printer's *flash* memory. There is not enough memory to store an Asian font.

To use International fonts, consider the following information:

All fonts contain an internal character mapping. The mapping is organized by one or more standards, such as BIG5. These mapping standards can provide over 65,000 characters, which are not represented in this manual.
The printer supports several mapping standards:

Unicode (UCS-2)

BIG5

GB2312

SJIS

Specify a symbol set based on the characters to print and one that is compatible with the font's character mapping. For example, to print Japanese characters, select symbol set 932 (Japanese Shift JIS) and a font compatible with that symbol set. See "Selecting a Symbol Set" for more information.

To enter batch data, use the method specified by the font's character mapping and a compatible symbol set.

Selecting a Symbol Set

Specify a symbol set based on the characters to print and one that is compatible with the font's character mapping. The symbol set parameter identifies the character mapping used in the text field or constant text field, for example, Unicode, BIG5, etc. If no symbol set is selected, the default symbol set (Internal Symbol Set) is used.

The printer automatically translates some character mappings to others. For example, if you need a BIG5 font, it is possible to use Unicode text data. Use Unicode in the symbol set parameter to indicate the text mapping and select the BIG5 font needed in the font parameter (T8 or C5). The printer automatically translates the Unicode character values into BIG5 values before printing the character.

The following table lists the compatible mappings and symbol sets.

Font Character Mapping		**Symbol Set Parameter (T15, C13, or A6)**
Batch Data*	TrueType Font Character Mapping	use in text or constant text fields
Unicode	BIG5	102 - Unicode If you are unsure which character mapping to select, use this symbol set, because the printer automatically translates the character mappings.
Unicode	SJIS	
Unicode	KSC5601	
Unicode	GB2312	
Unicode	Unicode	
BIG5	Unicode	103 - BIG5
GB2312	Unicode	104 - GB2312
SJIS	SJIS	105 - SJIS (Code Page 932 - Japanese Shift-JIS)
GB2312	GB2312	106 - GB2312 (Code Page 936 - Simplified Chinese)
BIG5	BIG5	107 - BIG5 (Code Page 950 - Traditional Chinese)
UTF-8	Unicode BIG5 SJIS KSC5601 GB2312	110 - Unicode UTF-8 If you are unsure which character mapping to select, use this symbol set, because the printer automatically translates the character mappings. Note: UTF-8 is very common. We recommend using it for compatibility with different host applications and data streams.

* Characters in batch data must be entered based on their mapping (Unicode, BIG5, etc.).

Note: Symbol sets 102-110 require the memory expansion option and a downloaded International TrueType font.

International Font Sample

```
{F,3,A,R,E,150,200,"SIMPLE" ¦
T,1,5,V,10,10,0,100,30,30,B,L,0,0,102¦}

{B,3,U,1 ¦
1,"~125~000~125~002~125~004~125~005"¦}
```

Symbol Set Parameter

Font Number

This example prints these four characters with Unicode batch data of ~125~000, ~125~002, ~125~004 and ~125~005.

紀紂約紅

Arabic Font Sample

```
{F,3,A,R,E,220,400,"SIMPLE"¦
T,1,250,V,40,380,0,1000,24,24,B,E,0,0,110¦
T,2,250,V,90,380,0,1000,24,24,B,E,0,0,110¦}

{B,3,N,1¦

1,"%5      95%      "¦
2,"5%قطب بوليستر cotton"¦}
```

This example prints on the 9855 printer with a downloaded Arabic font and the printer's Numeric Format set as **Default**.

5% polyester 95% cotton

%5 بوليستر %95 قطب

Refer to the Internet for a listing of the characters in each code page. Search on a particular code page, such as “codepage 936" to view the characters in that code page.

Licensing Your Fonts

We provide you with tools to create and download TrueType fonts. However, it is your responsibility to purchase and license any fonts you download to your printer. Contact your font supplier for licensing information. Additional fonts that are compatible with the printer can be purchased from:

The Electronic Font Foundry
11 Silwood Road; Ascot; SL5 OPY; England
(0)1344 875 201
www.eff.co.uk

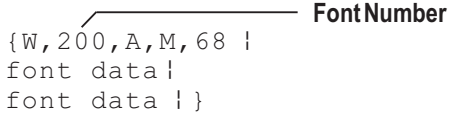
Korean, Chinese, and Japanese fonts can be purchased from:

Dynalab Inc.
2055 Gateway Place; Suite 400; San Jose, CA 95110
408-490-4224
www.dynalab.com

Locating the Font Number in a Font Packet

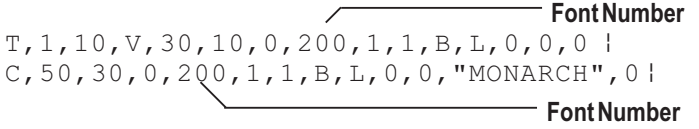
If you are creating font packets, the font number is the second parameter in the packet. Software is available to create the font data and packet. Call Technical Support for more information.

Example



Use this number in **T8** or in **C5**. See “Defining Text Fields” or “Defining Constant Text Fields” in Chapter 2 for more information.l

Example



Defines a text and constant text field using the downloaded (#200) font.

SYMBOL SETS/CODE PAGES

C

This appendix contains a listing of the symbol sets, code pages, and extended character sets the printer supports.

Use the charts in this appendix to convert dot sequences from the image dot pattern to codes you can use in the fields. Use the Binary to Hex Conversion Chart to convert Binary dot sequences to Hexadecimal numbers for bitmap files. Use the Dot to Run Length Encoding Chart to convert dot sequences to alphabetic characters for bitmap files.

Supported Symbol Sets and Code Pages

The printers support these symbol sets and code pages: Internal, ANSI, Bold, OCRA Character Set, DOS Code Page 437 and 850. Additional Code Pages are supported with downloaded TrueType or Unicode (double-byte) fonts.

The printer defaults to the internal symbol set. See “Defining the System Setup Packet” in Chapter 2 to change the symbol set.

Selecting a Symbol Set or Code Page

The CG Triumvirate™ typefaces support only the ANSI and DOS Code Page 437 and 850 Symbol Sets. These fonts print a slashed zero when using the ANSI symbol set.

Internal	Use this symbol set to print international monetary symbols, the trademark (™) symbol, and for formats that may be used on other MPCLII printers.
ANSI	Use this symbol set with proportionally spaced fonts.
DOS Code Pages 437 or 850	Use this symbol set for extended and international characters with proportionally spaced fonts.

Using Code 128 Function Codes

This table lists the characters for Bar Code 128 function codes. These functions are used with scanners.

Code	Function Code
~201	F1
~202	F2
~203	F3
~204	F4

Entering Extended Characters

When using extended characters in your batch data file, type a tilde in front of the three-digit code. For example, if you want to include the character Ä in a text field using the Internal Symbol Set, type:

```
1,"~142" ¦
```

Using International Character Sets/Code Pages

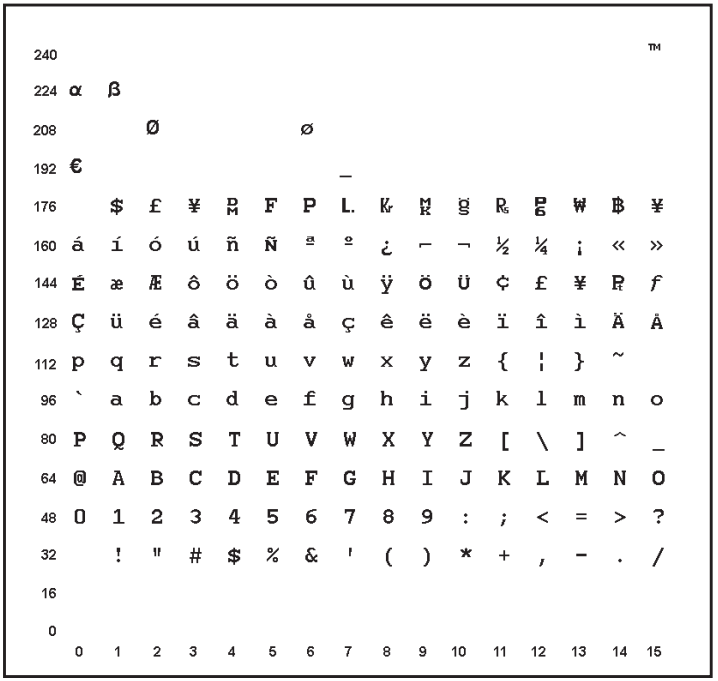
Symbol sets 100, 101, 852-860, and 1250-1258 may only be used with the scalable font (font#50) or downloaded TrueType fonts. TrueType fonts are designed to be regionally specific; therefore, all symbol sets may not be supported in a given font. For example, to print Hebrew characters, you need to find a font (such as Arial) that supports Hebrew characters; convert, and then download the font to your printer. Make sure the correct symbol set for Hebrew characters is selected.

Font 50 does not print the slashed zero or support Code Pages 101 (Wingdings) and 1256 (Arabic). The Euro-dollar symbol at position **~192** is only available in the Standard, Reduced, and Bold fonts.

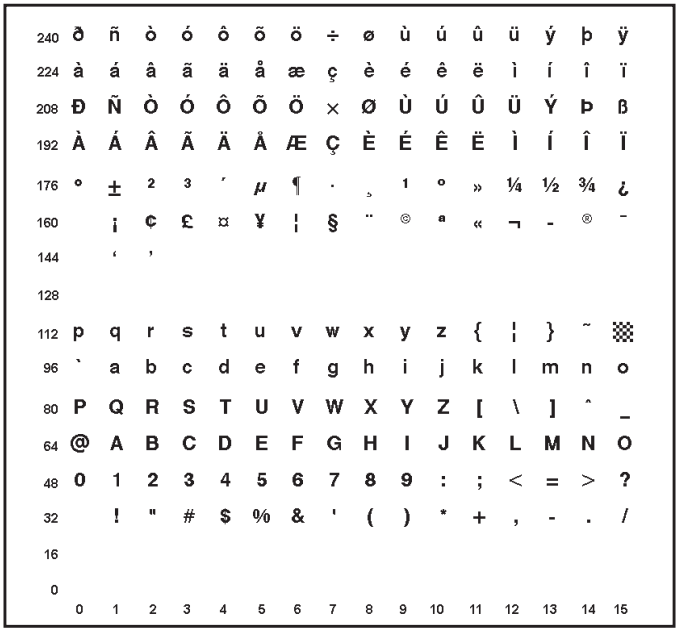
Code pages 102-107, 932, 936, and 950 contain thousands of characters, which are not represented in this manual. These code pages require the memory expansion option and a downloaded International TrueType font.

The Code Pages (100 and greater) on the following pages were printed using Arial or a similar downloaded TrueType font. To determine the character code, add the column number and row number for the character. For example, to produce the ÿ character with the ANSI character set, you would press Alt 255 (column 15 + row 240).

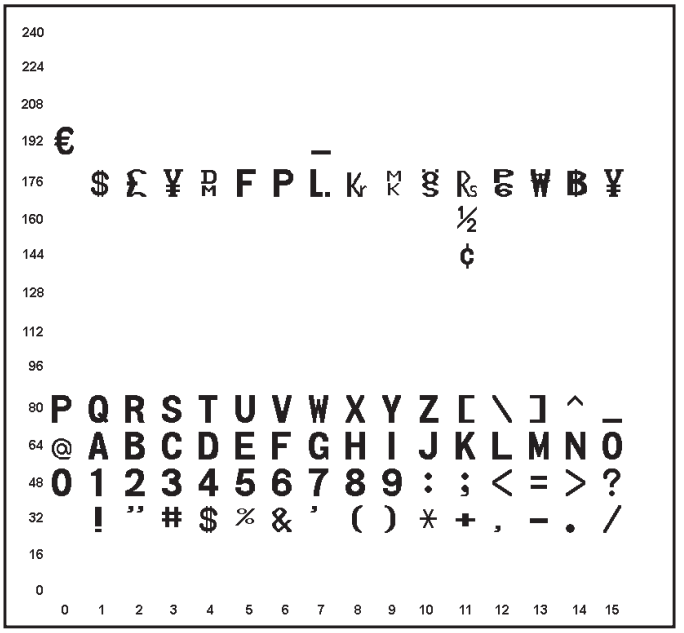
Internal Symbol Set


240 ™
224 α ß
208 Ø ø
192 € _
176 $ £ ¥ ₱ F ₱ ₺ ₭ ₦ ₲ ₨ ₩ ฿ ¥
160 á í ó ú ñ Ñ ª º ¿ ⌐ ¬ ½ ¼ ¡ « »
144 É æ Æ ô ö ò û ù ÿ Ö Ü ¢ £ ¥ ₱ ƒ
128 Ç ü é â ä à å ç ê ë è ï î ì Ä Å
112 p q r s t u v w x y z { ¦ } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

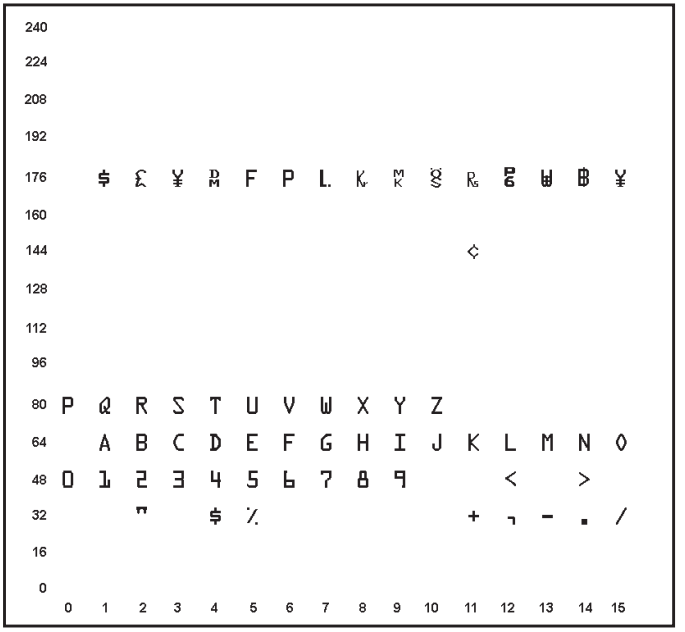
ANSI Symbol Set


240 ð ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ ÿ
224 à á â ã ä å æ ç è é ê ë ì í î ï
208 Ð Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß
192 À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï
176 ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿
160 ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ - ® ¯
144 ‘ ’
128
112 p q r s t u v w x y z { ¦ } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

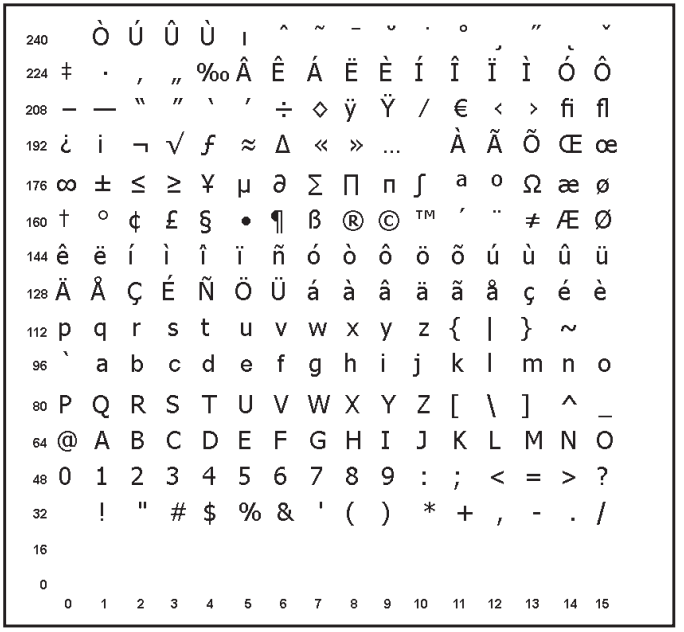
Bold Character Set



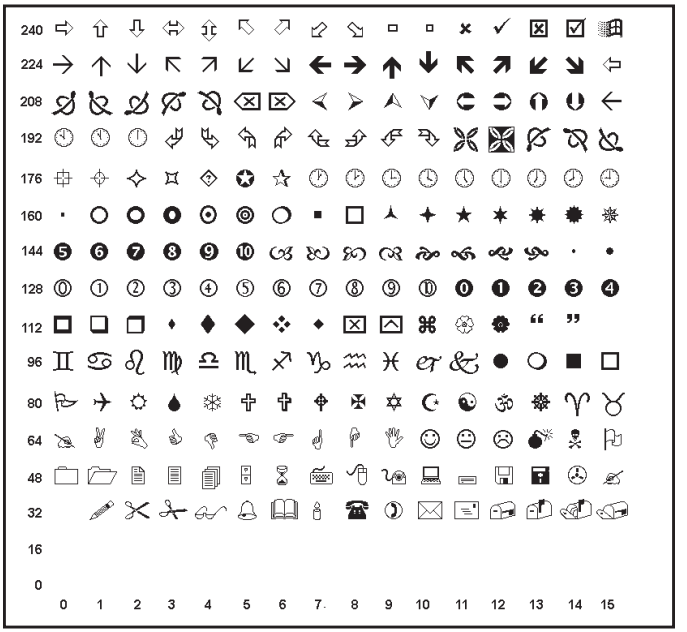
OCRA Character Set



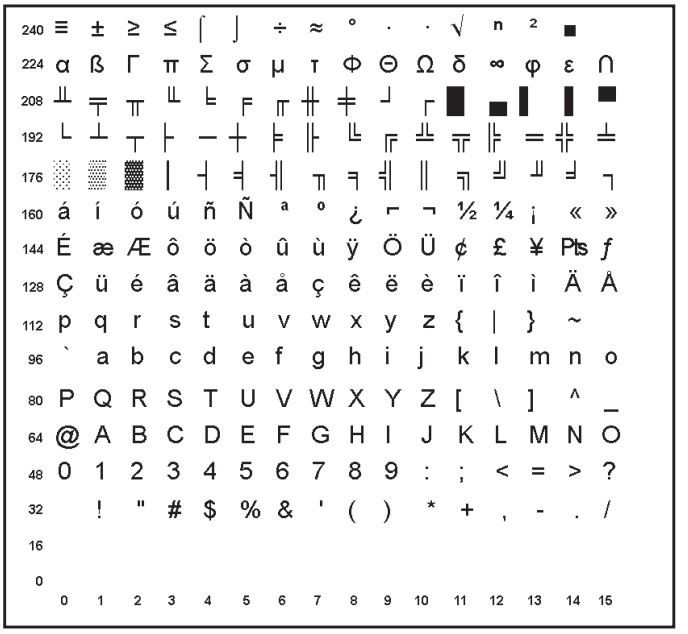
Code Page 100 (Macintosh)


240 Ò Ú Û Ù ı ˆ ˜ ¯ ˘ ˙ ˚ ¸ ˝ ˛ ˇ
224 ‡ · ‚ „ ‰ Â Ê Á Ë È Í Î Ï Ì Ó Ô
208 – — “ ” ‘ ’ ÷ ◊ ÿ Ÿ ⁄ € ‹ › fi fl
192 ¿ ¡ ¬ √ ƒ ≈ ∆ « » … Ã À Õ Œ œ
176 ∞ ± ≤ ≥ ¥ µ ∂ ∑ ∏ π ∫ ª º Ω æ ø
160 † ° ¢ £ § • ¶ ß ® © ™ ´ ¨ ≠ Æ Ø
144 ê ë í ì î ï ñ ó ò ô ö õ ú ù û ü
128 Ä Å Ç É Ñ Ö Ü á à â ä ã å ç é è
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

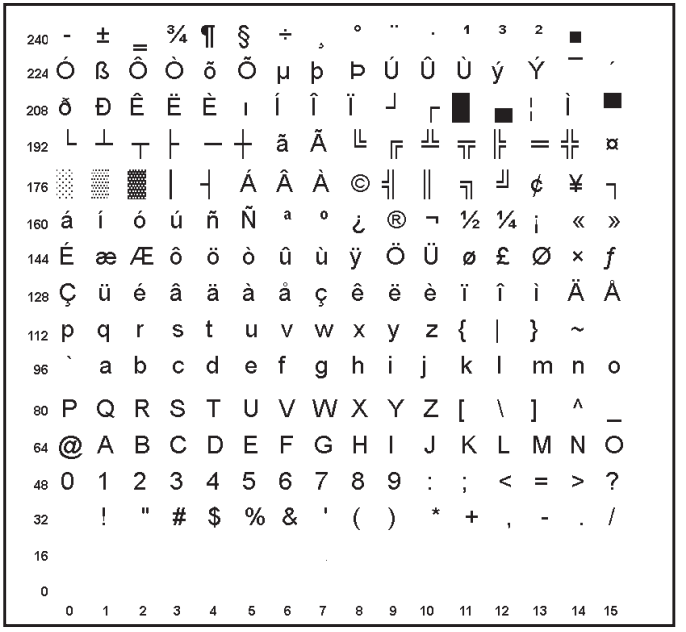
Code Page 101 (Wingdings)



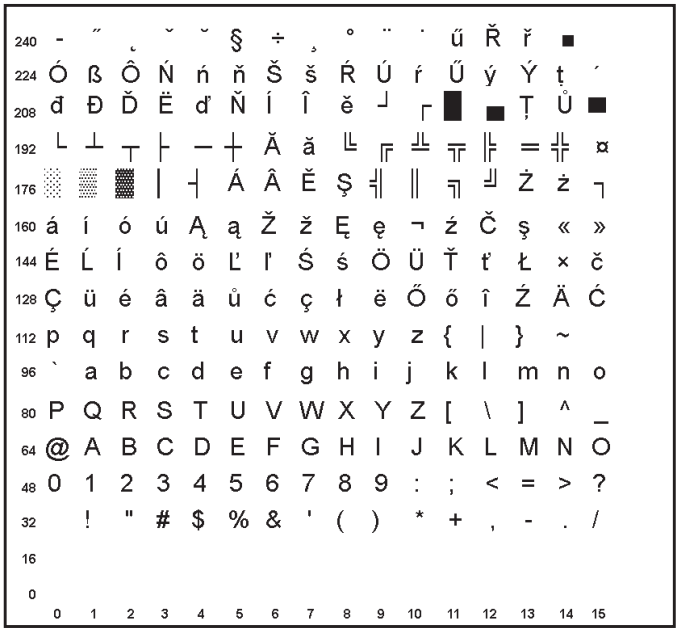
Code Page 437 (Latin U.S.)


240 ≡ ± ≥ ≤ ⌠ ⌡ ÷ ≈ ° · · √ n ²
224 α ß Γ π Σ σ µ τ Φ Θ Ω δ ∞ φ ε ∩
208 ╨ ╤ ╥ ╙ ╘ ╒ ╓ ╫ ╪ ┘ ┌ ▄ ▌ ▐ ▀
192 └ ┴ ┬ ├ ─ ┼ ╞ ╟ ╚ ╔ ╩ ╦ ╠ ═ ╬ ╧
176 ▒ ▓ ▓ │ ┤ ╡ ╢ ╖ ╕ ╣ ║ ╗ ╝ ╜ ╛ ┐
160 á í ó ú ñ Ñ ª º ¿ ⌐ ¬ ½ ¼ ¡ « »
144 É æ Æ ô ö ò û ù ÿ Ö Ü ¢ £ ¥ ₧ ƒ
128 Ç ü é â ä à å ç ê ë è ï î ì Ä Å
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

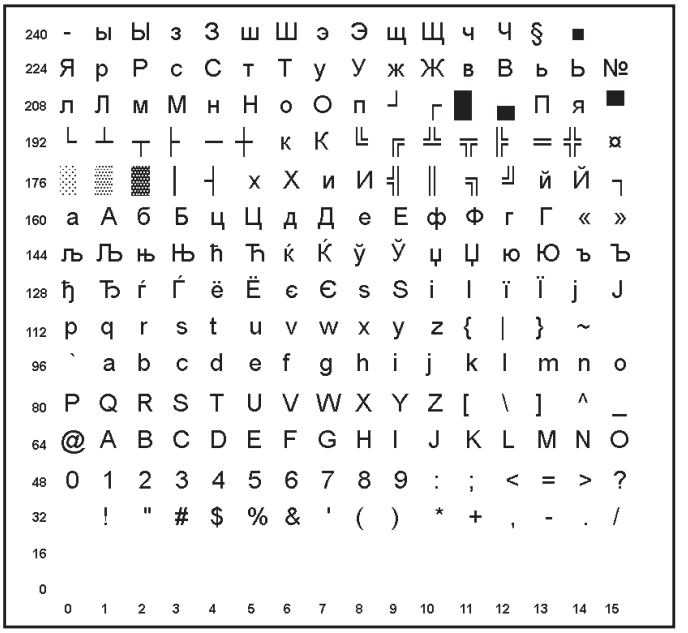
Code Page 850 (Latin 1)


240 - ± ‗ ¾ ¶ § ÷ ¸ ° ¨ · ¹ ³ ² ■
224 Ó ß Ô Ò õ Õ µ þ Þ Ú Û Ù ý Ý ¯ ´
208 ð Ð Ê Ë È ı Í Î Ï ┘ ┌ █ ▄ ¦ Ì ▀
192 └ ┴ ┬ ├ ─ ┼ ã Ã ╚ ╔ ╩ ╦ ╠ ═ ╬ ¤
176 ░ ▒ ▓ │ ┤ Á Â À © ╣ ║ ╗ ╝ ¢ ¥ ┐
160 á í ó ú ñ Ñ ª º ¿ ® ¬ ½ ¼ ¡ « »
144 É æ Æ ô ö ò û ù ÿ Ö Ü ø £ Ø × ƒ
128 Ç ü é â ä à å ç ê ë è ï î ì Ä Å
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

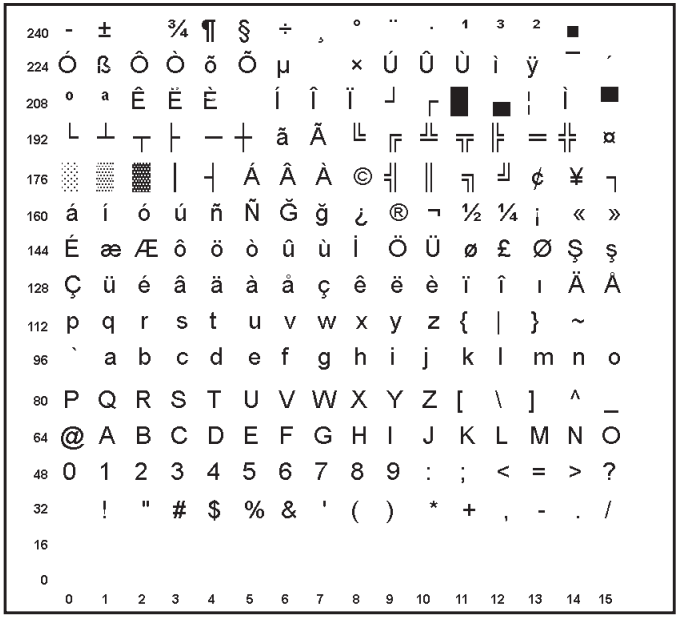
Code Page 852 (Latin 2)


240 - ˝ ˛ ˇ ˘ § ÷ ¸ ° ¨ · ű Ř ř ■
224 Ó ß Ô Ń ń ň Š š Ŕ Ú ŕ Ű ý Ý ţ ´
208 đ Đ Ď Ë ď Ň Í Î ě ┘ ┌ █ ▄ Ţ Ů ▀
192 └ ┴ ┬ ├ ─ ┼ Ă ă ╚ ╔ ╩ ╦ ╠ ═ ╬ ¤
176 ░ ▒ ▓ │ ┤ Á Â Ě Ş ╣ ║ ╗ ╝ Ż ż ┐
160 á í ó ú Ą ą Ž ž Ę ę ¬ ź Č ş « »
144 É Ĺ Í ô ö Ľ ľ Ś ś Ö Ü Ť ť Ł × č
128 Ç ü é â ä ů ć ç ł ë Ő ő î Ź Ä Ć
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

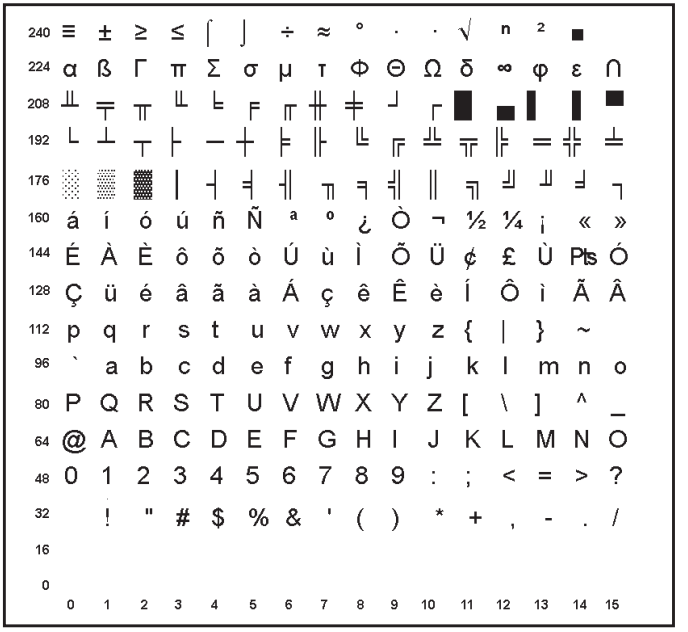
Code Page 855 (Russian)



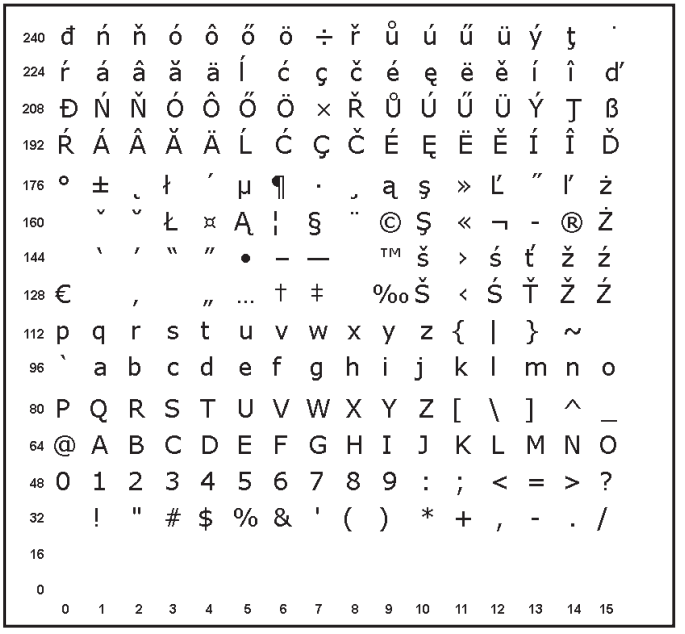
Code Page 857 (IBM Turkish)


240 - ± ¾ ¶ § ÷ ¸ ° ¨ · ¹ ³ ² ■
224 Ó ß Ô Ò õ Õ µ × Ú Û Ù ì ÿ ¯ ´
208 º ª Ê Ë È Í Î Ï ┘ ┌ ¦ Ì ■
192 └ ┴ ┬ ├ ─ ┼ ã Ã ╚ ╔ ╩ ╦ ╠ ═ ╬ ¤
176 ░ ▒ ▓ │ ┤ Á Â À © ╣ ║ ╗ ╝ ¢ ¥ ┐
160 á í ó ú ñ Ñ Ğ ğ ¿ ® ¬ ½ ¼ ¡ « »
144 É æ Æ ô ö ò û ù İ Ö Ü ø £ Ø Ş ş
128 Ç ü é â ä à å ç ê ë è ï î ı Ä Å
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

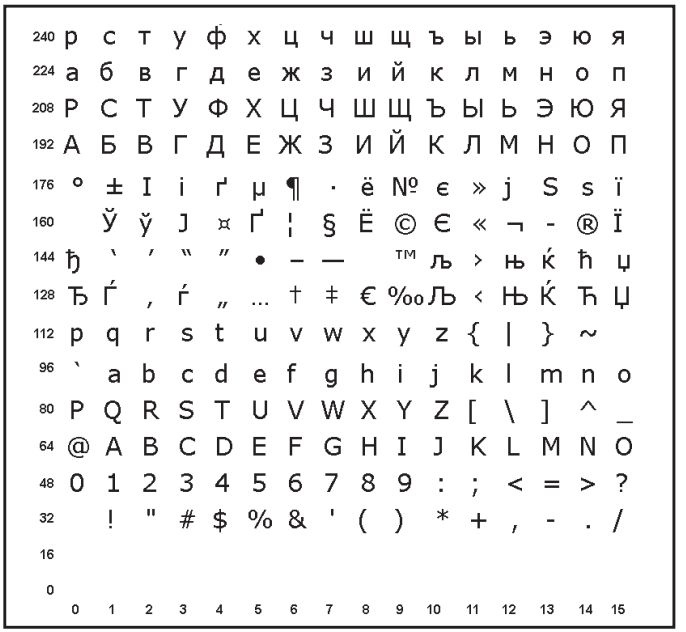
Code Page 860 (MS-DOS Portuguese)


240 ≡ ± ≥ ≤ ⌠ ⌡ ÷ ≈ ° ∙ · √ n ² ■
224 α ß Γ π Σ σ µ τ Φ Θ Ω δ ∞ φ ε ∩
208 ╨ ╤ ╥ ╙ ╘ ╒ ╓ ╫ ╪ ┘ ┌ ▀ ▄ ▌ ▐ ■
192 └ ┴ ┬ ├ ─ ┼ ╞ ╟ ╚ ╔ ╩ ╦ ╠ ═ ╬ ╧
176 ░ ▒ ▓ │ ┤ ╡ ╢ ╖ ╕ ╣ ║ ╗ ╝ ╜ ╛ ┐
160 á í ó ú ñ Ñ ª º ¿ Ò ¬ ½ ¼ ¡ « »
144 É À È ô õ ò Ú ù Ì Õ Ü ¢ £ Ù ₧ Ó
128 Ç ü é â ã à Á ç ê Ê è Í Ô ì Ã Â
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

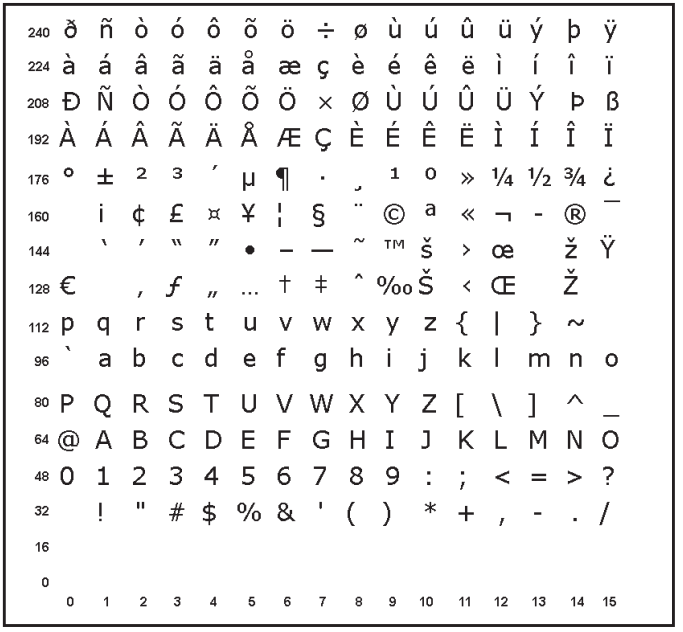
Code Page 1250 (Latin 2)


240 đ ń ň ó ô ő ö ÷ ř ů ú ű ü ý ţ ˙
224 ŕ á â ă ä Í ć ç č é ę ë ě í î ď
208 Đ Ń Ň Ó Ô Ő Ö × Ř Ů Ú Ű Ü Ý Ţ ß
192 Ŕ Á Â Ă Ä Ĺ Ć Ç Č É Ę Ë Ě Í Î Ď
176 ° ± ˛ ł ´ µ ¶ · ¸ ą ş » Ľ ˝ ľ ż
160 ˇ ˘ Ł ¤ Ą ¦ § ¨ © Ş « ¬ - ® Ż
144 ` ' " ˝ • – — ™ š › ś ť ž ź
128 € , „ … † ‡ ‰ Š ‹ Ś Ť Ž Ź
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

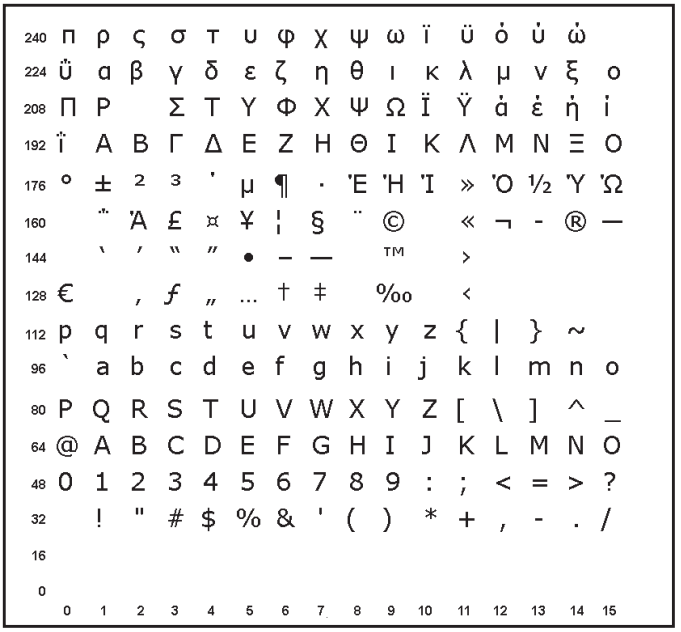
Code Page 1251 (Cyrillic)



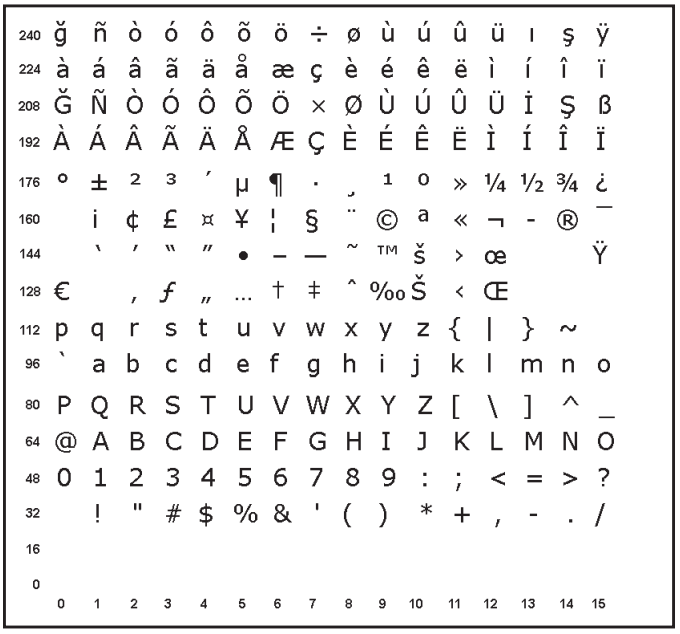
Code Page 1252 (Latin 1)


240 ð ñ ò ó ô õ ö ÷ ø ù ú û ü ý þ ÿ
224 à á â ã ä å æ ç è é ê ë ì í î ï
208 Ð Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü Ý Þ ß
192 À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï
176 ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿
160 ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ - ® ¯
144 ‘ ’ ‚ “ • – — ˜ ™ š › œ ž Ÿ
128 € , ƒ „ … † ‡ ˆ ‰ Š ‹ Œ Ž
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

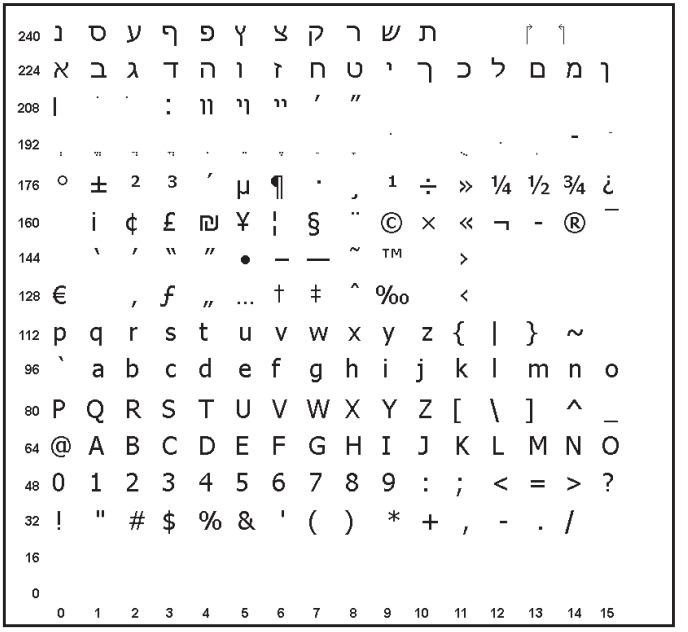
Code Page 1253 (Greek)



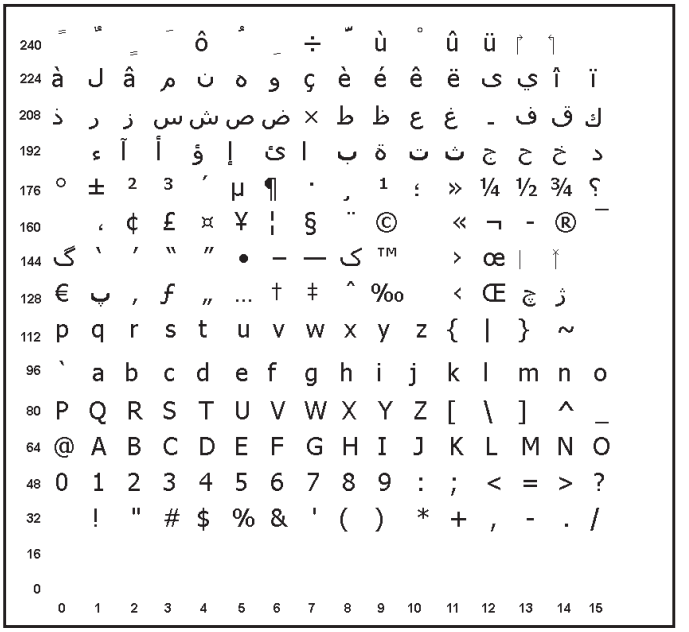
Code Page 1254 (Turkish)


240 ğ ñ ò ó ô õ ö ÷ ø ù ú û ü ı ş ÿ
224 à á â ã ä å æ ç è é ê ë ì í î ï
208 Ğ Ñ Ò Ó Ô Õ Ö × Ø Ù Ú Û Ü İ Ş ß
192 À Á Â Ã Ä Å Æ Ç È É Ê Ë Ì Í Î Ï
176 ° ± ² ³ ´ µ ¶ · ¸ ¹ º » ¼ ½ ¾ ¿
160 ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ - ® ¯
144 ‘ ’ “ ” • – — ˜ ™ š › œ Ÿ
128 € , ƒ „ … † ‡ ˆ ‰ Š ‹ Œ
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

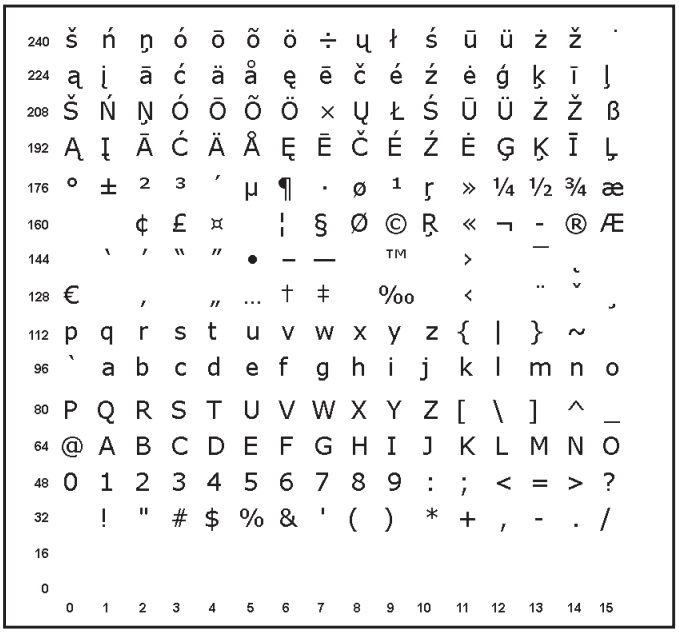
Code Page 1255 (Hebrew)


240 נ ס ע ף פ ץ צ ק ר ש ת ‎ ‏ ‎
224 א ב ג ד ה ו ז ח ט י ך כ ל ם מ ן
208 ׀ ׁ ׂ ׃ ׄ ׅ ׆ ׇ ־ ׿
192 ׀ ׁ ׂ ׃ ׄ ׅ ׆ ׇ ־ ׿
176 ° ± ² ³ ´ µ ¶ · ¸ ¹ ÷ » ¼ ½ ¾ ¿
160 ¡ ¢ £ ₪ ¥ ¦ § ¨ © × « ¬ - ® ¯
144 ‘ ’ ‚ “ ” • – — ˜ ™ › ‎ ‏ ‎
128 € ‎ ‚ ƒ „ … † ‡ ˆ ‰ ‹ ‎ ‏ ‎
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

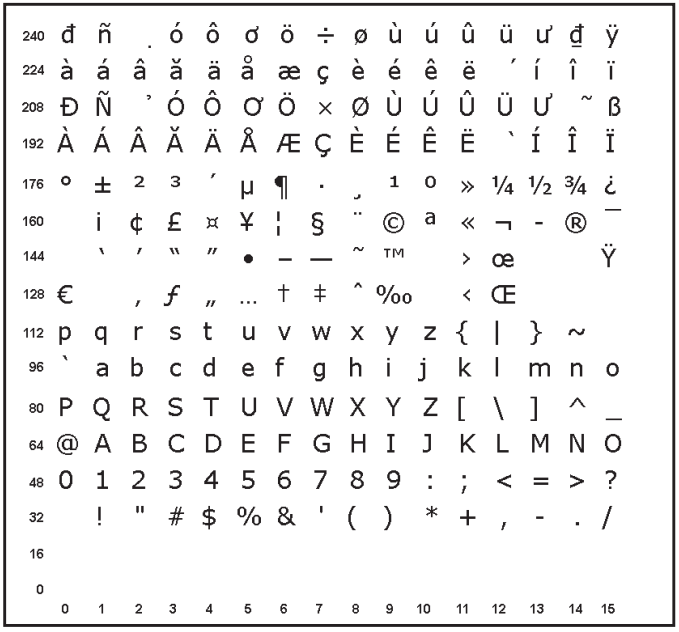
Code Page 1256 (Arabic)


240 ً ٌ ٍ َ ô ُ ِ ÷ ّ ù ْ û ü ‎ ‏ ‎
224 à ل â م ن ه و ç è é ê ë ى ي î ï
208 ذ ر ز س ش ص ض × ط ظ ع غ ـ ف ق ك
192 ء آ أ ؤ إ ئ ا ب ة ت ث ج ح خ د
176 ° ± ² ³ ´ µ ¶ · ¸ ¹ ؛ » ¼ ½ ¾ ؟
160 ، ¢ £ ¤ ¥ ¦ § ¨ © « ¬ - ® ¯
144 گ ‘ ’ ‚ “ ” • – — ک ™ › œ ‎ ‏ ‎
128 € پ ‚ ƒ „ … † ‡ ˆ ‰ ‹ Œ چ ژ
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Code Page 1257 (Baltic)


240 š ń ņ ó ō õ ö ÷ ų ł ś ū ü ż ž ˙
224 ą į ā ć ä å ę ē č é ź ė ģ ķ ī ļ
208 Š Ń Ņ Ó Ō Õ Ö × Ų Ł Ś Ū Ü Ż Ž ß
192 Ą Į Ā Ć Ä Å Ę Ē Č É Ź Ė Ģ Ķ Ī Ļ
176 ° ± ² ³ ´ µ ¶ · ø ¹ ŗ » ¼ ½ ¾ æ
160 ¢ £ ¤ ¦ § Ø © Ŗ « ¬ - ® Æ
144 ‘ ’ ‚ “ ” • – — ™ › ¯ ˛
128 € „ … † ‡ ‰ ‹ ¨ ˇ ¸
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

Code Page 1258 (Vietnamese)


240 đ ñ ̉ ó ô ơ ö ÷ ø ù ú û ü ư ₫ ÿ
224 à á â ă ä å æ ç è é ê ë ́ í î ï
208 Đ Ñ ̀ Ó Ô Ơ Ö × Ø Ù Ú Û Ü Ư ̃ ß
192 À Á Â Ă Ä Å Æ Ç È É Ê Ë ̀ Í Î Ï
176 ° ± ² ³ ´ µ ¶ · ̧ ¹ º » ¼ ½ ¾ ¿
160 ¡ ¢ £ ¤ ¥ ¦ § ¨ © ª « ¬ - ® ¯
144 ‘ ’ ‚ “ ” • – — ̃ ™ › œ Ÿ
128 € , ƒ „ … † ‡ ̂ ‰ ‹ Œ
112 p q r s t u v w x y z { | } ~
96 ` a b c d e f g h i j k l m n o
80 P Q R S T U V W X Y Z [\ ] ^ _
64 @ A B C D E F G H I J K L M N O
48 0 1 2 3 4 5 6 7 8 9 : ; < = > ?
32 ! " # $ % & ' ( ) * + , - . /
16
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

ASCII to Hexadecimal Conversion Chart

Use the chart below to translate the characters printed on your test label. The chart lists ASCII characters and their hexadecimal and decimal equivalents.

Char.	Hex	Decimal	Char.	Hex	Decimal
NUL	00	0	DC2	12	18
SOH	01	1	DC3	13	19
STX	02	2	DC4	14	20
ETX	03	3	NAK	15	21
EOT	04	4	SYN	16	22
ENQ	05	5	ETB	17	23
ACK	06	6	CAN	18	24
BEL	07	7	EM	19	25
Backspace	08	8	SUB	1A	26
Tab	09	9	Escape	1B	27
linefeed	0A	10	cursor right	1C	28
home	0B	11	cursor left	1D	29
form feed	0C	12	cursor up	1E	30
carriage return	0D	13	cursor down	1F	31
SO	0E	14	space	20	32
SI	0F	15	!	21	33
DLE	10	16	“	22	34
DC1	11	17	#	23	35

ASCII to Hexadecimal Conversion Chart (continued)

Char.	Hex	Decimal	Char.	Hex	Decimal
$	24	36	;	3B	59
%	25	37	<	3C	60
&	26	38	=	3D	61
‘	27	39	>	3E	62
(	28	40	?	3F	63
)	29	41	@	40	64
*	2A	42	A	41	65
++	2B	43	B	42	66
,	2C	44	C	43	67
-	2D	45	D	44	68
.	2E	46	E	45	69
/	2F	47	F	46	70
0	30	48	G	47	71
1	31	49	H	48	72
2	32	50	I	49	73
3	33	51	J	4A	74
4	34	52	K	4B	75
5	35	53	L	4C	76
6	36	54	M	4D	77
7	37	55	N	4E	78
8	38	56	O	4F	79
9	39	57	P	50	80
:	3A	58	Q	51	81

ASCII to Hexadecimal Conversion Chart (continued)

Char.	Hex	Decimal	Char.	Hex	Decimal
R	52	82	i	69	105
S	53	83	j	6A	106
T	54	84	k	6B	107
U	55	85	l	6C	108
V	56	86	m	6D	109
W	57	87	n	6E	110
X	58	88	o	6F	111
Y	59	89	p	70	112
Z	5A	90	q	71	113
[	5B	91	r	72	114
\	5C	92	s	73	115
]	5D	93	t	74	116
^^	5E	94	u	75	117
_	5F	95	v	76	118
`	60	96	w	77	119
a	61	97	x	78	120
b	62	98	y	79	121
c	63	99	z	7A	122
d	64	100	{	7B	123
e	65	101	¦	7C	124
f	66	102	}	7D	125
g	67	103	~	7E	126
h	68	104	delete	7F	127

Binary to Hex Conversion Chart

Binary	Hex	Binary	Hex
00000000	00	00100000	20
00000001	01	00100001	21
00000010	02	00100010	22
00000011	03	00100011	23
00000100	04	00100100	24
00000101	05	00100101	25
00000110	06	00100110	26
00000111	07	00100111	27
00001000	08	00101000	28
00001001	09	00101001	29
00001010	0A	00101010	2A
00001011	0B	00101011	2B
00001100	0C	00101100	2C
00001101	0D	00101101	2D
00001110	0E	00101110	2E
00001111	0F	00101111	2F
00010000	10	00110000	30
00010001	11	00110001	31
00010010	12	00110010	32
00010011	13	00110011	33
00010100	14	00110100	34
00010101	15	00110101	35
00010110	16	00110110	36
00010111	17	00110111	37
00011000	18	00111000	38
00011001	19	00111001	39
00011010	1A	00111010	3A
00011011	1B	00111011	3B
00011100	1C	00111100	3C
00011101	1D	00111101	3D
00011110	1E	00111110	3E
00011111	1F	00111111	3F

Binary to Hexadecimal Conversion Chart (continued)

Binary	Hex	Binary	Hex
01000000	40	01100000	60
01000001	41	01100001	61
01000010	42	01100010	62
01000011	43	01100011	63
01000100	44	01100100	64
01000101	45	01100101	65
01000110	46	01100110	66
01000111	47	01100111	67
01001000	48	01101000	68
01001001	49	01101001	69
01001010	4A	01101010	6A
01001011	4B	01101011	6B
01001100	4C	01101100	6C
01001101	4D	01101101	6D
01001110	4E	01101110	6E
01001111	4F	01101111	6F
01010000	50	01110000	70
01010001	51	01110001	71
01010010	52	01110010	72
01010011	53	01110011	73
01010100	54	01110100	74
01010101	55	01110101	75
01010110	56	01110110	76
01010111	57	01110111	77
01011000	58	01111000	78
01011001	59	01111001	79
01011010	5A	01111010	7A
01011011	5B	01111011	7B
01011100	5C	01111100	7C
01011101	5D	01111101	7D
01011110	5E	01111110	7E
01011111	5F	01111111	7F

Binary to Hexadecimal Conversion Chart (continued)

Binary	Hex	Binary	Hex
10000000	80	10100000	A0
10000001	81	10100001	A1
10000010	82	10100010	A2
10000011	83	10100011	A3
10000100	84	10100100	A4
10000101	85	10100101	A5
10000110	86	10100110	A6
10000111	87	10100111	A7
10001000	88	10101000	A8
10001001	89	10101001	A9
10001010	8A	10101010	AA
10001011	8B	10101011	AB
10001100	8C	10101100	AC
10001101	8D	10101101	AD
10001110	8E	10101110	AE
10001111	8F	10101111	AF
10010000	90	10110000	B0
10010001	91	10110001	B1
10010010	92	10110010	B2
10010011	93	10110011	B3
10010100	94	10110100	B4
10010101	95	10110101	B5
10010110	96	10110110	B6
10010111	97	10110111	B7
10011000	98	10111000	B8
10011001	99	10111001	B9
10011010	9A	10111010	BA
10011011	9B	10111011	BB
10011100	9C	10111100	BC
10011101	9D	10111101	BD
10011110	9E	10111110	BC
10011111	9F	10111111	BF

Binary to Hexadecimal Conversion Chart (continued)

Binary	Hex	Binary	Hex
11000000	C0	11100000	E0
11000001	C1	11100001	E1
11000010	C2	11100010	E2
11000011	C3	11100011	E3
11000100	C4	11100100	E4
11000101	C5	11100101	E5
11000110	C6	11100110	E6
11000111	C7	11100111	E7
11001000	C8	11101000	E8
11001001	C9	11101001	E9
11001010	CA	11101010	EA
11001011	CB	11101011	EB
11001100	CC	11101100	EC
11001101	CD	11101101	ED
11001110	CE	11101110	EE
11001111	CF	11101111	EF
11010000	D0	11110000	F0
11010001	D1	11110001	F1
11010010	D2	11110010	F2
11010011	D3	11110011	F3
11010100	D4	11110100	F4
11010101	D5	11110101	F5
11010110	D6	11110110	F6
11010111	D7	11110111	F7
11011000	D8	11111000	F8
11011001	D9	11111001	F9
11011010	DA	11111010	FA
11011011	DB	11111011	FB
11011100	DC	11111100	FC
11011101	DD	11111101	FD
11011110	DE	11111110	FE
11011111	DF	11111111	FF

Dot to Run Length Encoding Chart

ON (Black) Dots

# of Dots	Code	# of Dots	Code
1	A	14	N
2	B	15	O
3	C	16	P
4	D	17	Q
5	E	18	R
6	F	19	S
7	G	20	T
8	H	21	U
9	I	22	V
10	J	23	W
11	K	24	X
12	L	25	Y
13	M	26	Z

OFF (White Dots)

# of Dots	Code	# of Dots	Code
1	a	14	n
2	b	15	o
3	c	16	p
4	d	17	q
5	e	18	r
6	f	19	s
7	g	20	t
8	h	21	u
9	i	22	v
10	j	23	w
11	k	24	x
12	l	25	y
13	m	26	z

FORMAT DESIGN TOOLS

D

Use copies of these worksheets and grids to create formats, batch data, and check digit schemes. You may want to keep copies of the completed forms for your records:

- Online Configuration Worksheet
- Batch Worksheet
- Check Digit Worksheet
- Supply Layout Grids (English, Metric, Dots)
- Format Worksheet
- Sample Format Worksheet

ONLINE HEADER

–	HEADER

SYSTEM SETUP

A	HEADER
	POWERUP MODE
	LANGUAGE
	SEPARATOR
	SLASH ZERO
	SYMBOL SET

SUPPLY SETUP

B	HEADER
	SUPPLY TYPE
	RIBBON ON
	FEED MODE
	SUPPLY POSN
	CUT POSN
	SKIP INDEX

PRINT CONTROL

C	HEADER
	CONTRAST
	PRINT ADJUST
	MARGIN ADJUST
	SPEED ADJUST
	PRINTHD WIDTH

MONETARY FORMATTING

D	HEADER
	CURRENCY SYMBOL
	SECONDARY
	DECIMALS

CONTROL CHARACTERS

M	HEADER
	START OF HEADER
	PARAMETER SEPARATOR
	CHAR. STRING
	FIELD SEPARATOR
	END OF TRANSMISSION
	DATA ESCAPE
	IMMED. COMMAND
	STATUS REQUEST
	JOB REQUEST

COMMUNICATION SETUP

T	HEADER
	BAUD
	WORD LENGTH
	STOP BITS
	PARITY
	FLOW CONTROL

BACK FEED CONTROL

G	HEADER
	ACTION
	DISPENSE POSITION
	BACK FEED DISTANCE

BUFFER ALLOCATION

M	HEADER
	BUFFER
	DEVICE
	BUFFER SIZE

Batch Worksheet

BATCH HEADER

B	B1 HEADER	B2 FORMAT #	B3 NEW / UPDATE	B4 QUANTITY

BATCH CONTROL

m	B1 HEADER	B2 FEED-MODE	B3 BATCH-SEP	B4 PRINT-MULT	B5 MULTI-PART	B6 CUT-TYPE	B7 CUT-MULT	B8 VER-MODE	B9 CASE-SET

BATCH DATA

FIELD #	DATA
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	

BATCH CONTINUATION

C	DATA
C	
C	
C	
C	
C	
C	
C	
C	
C	
C	
C	
C	
C	

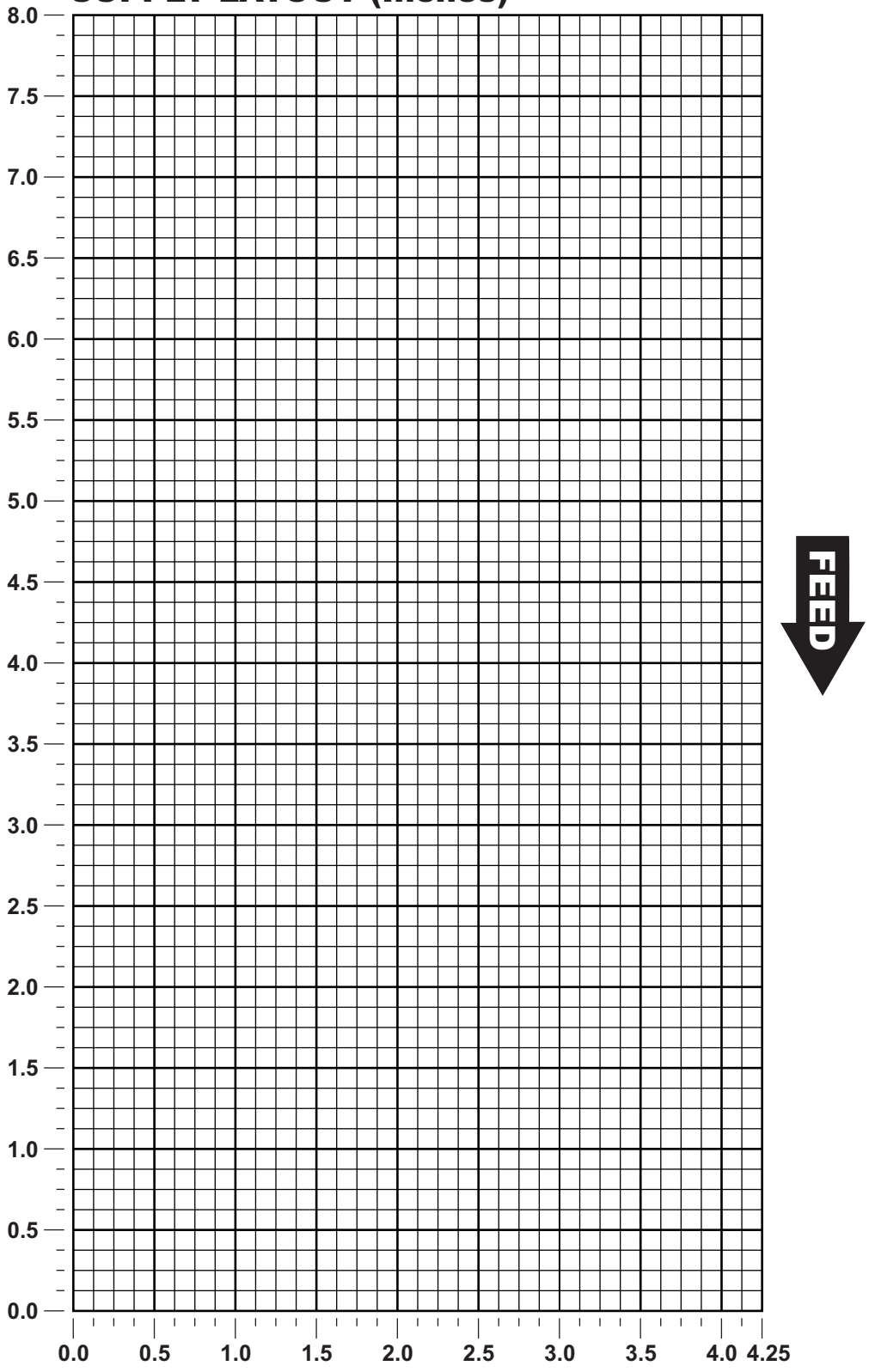
Check Digit Worksheet



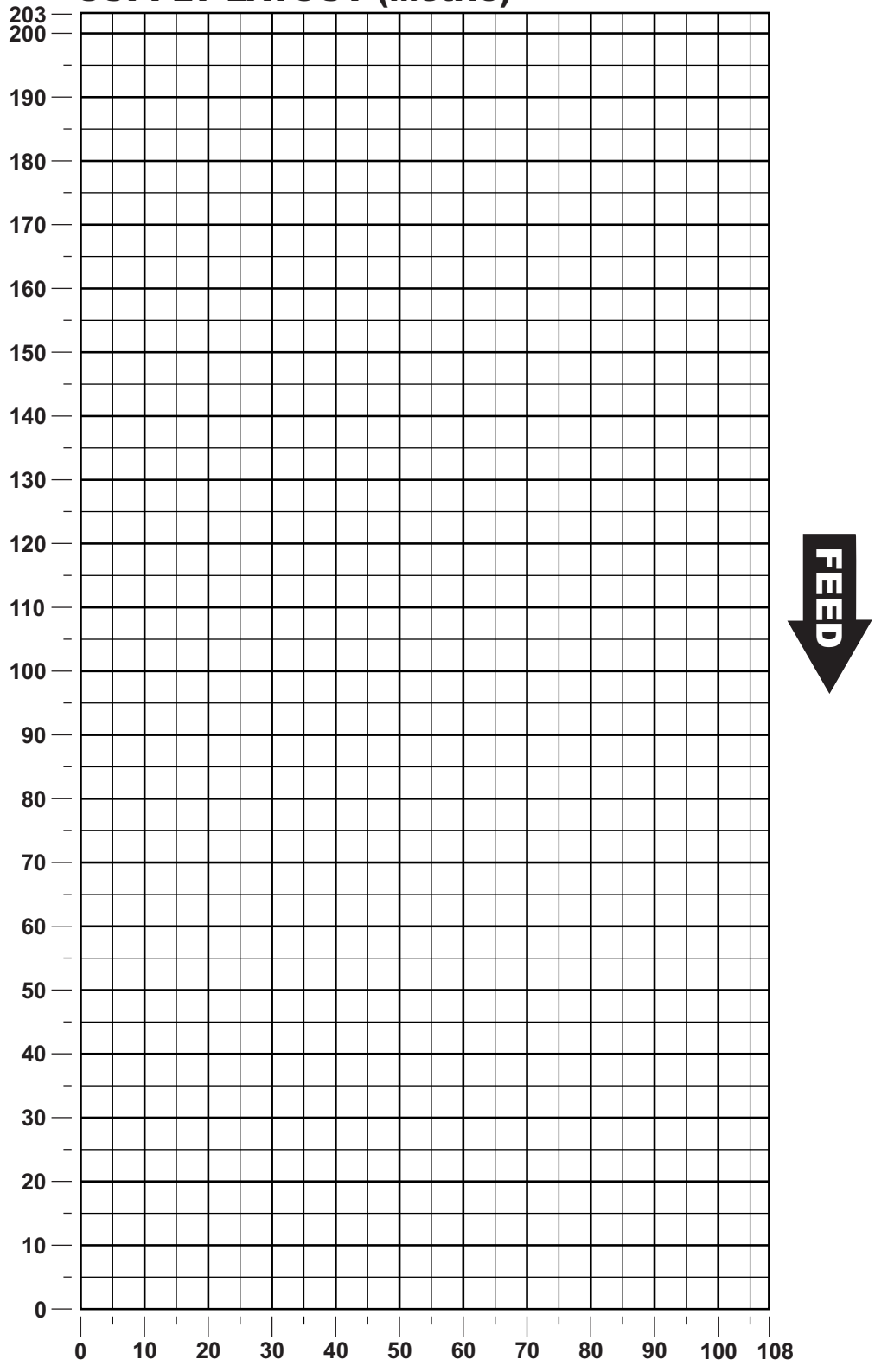


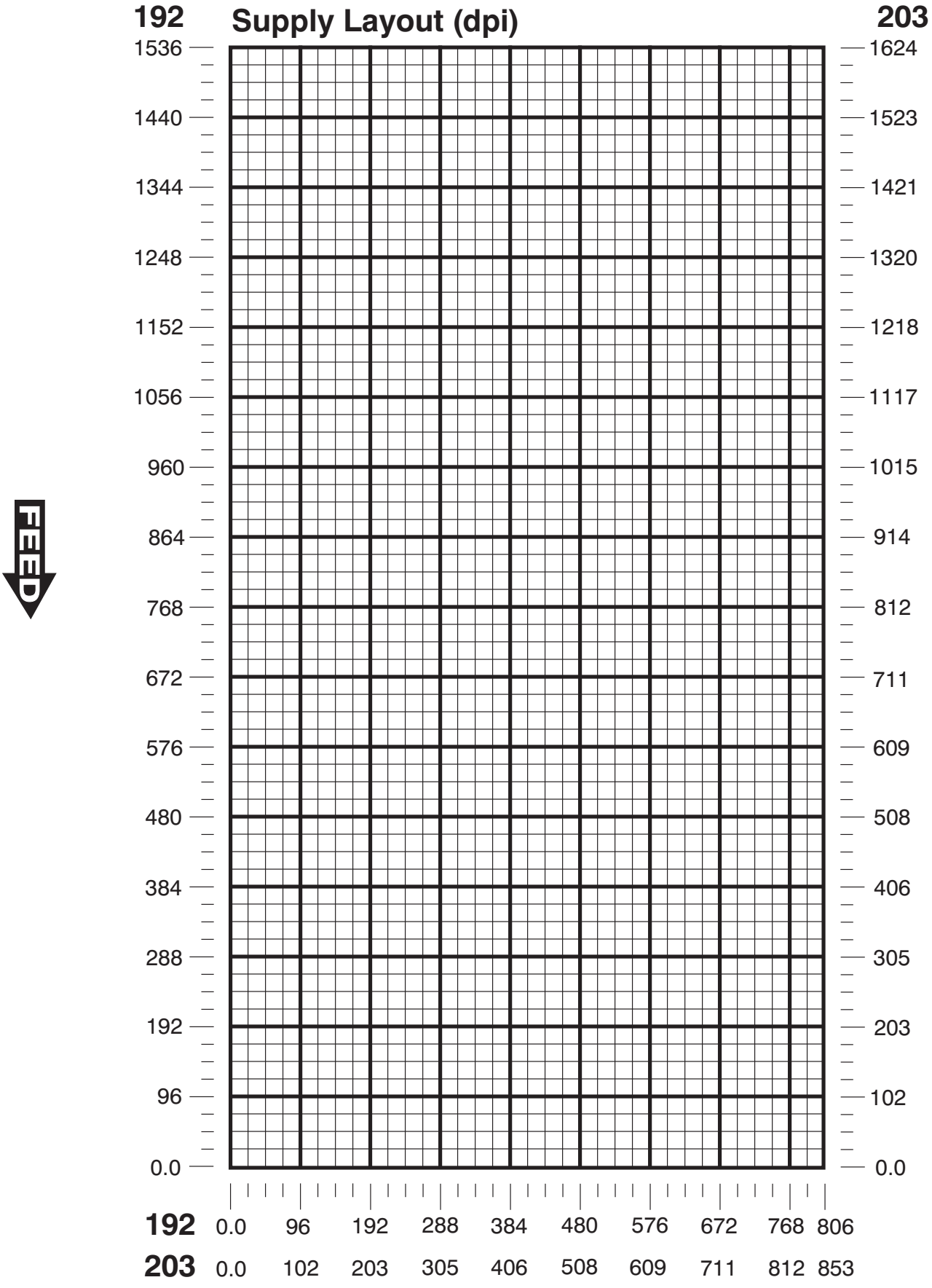


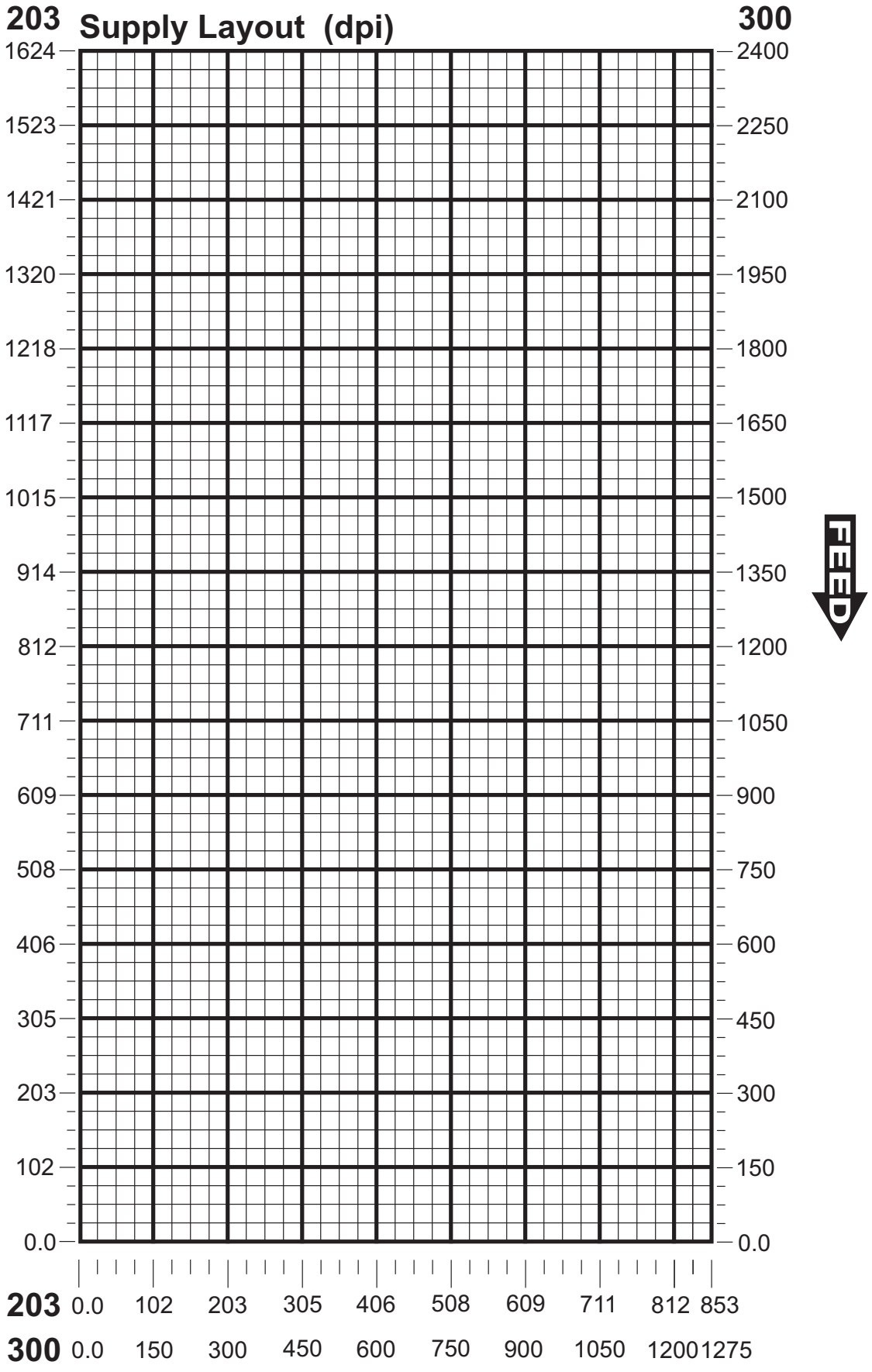
SUPPLY LAYOUT (Inches)



SUPPLY LAYOUT (Metric)




192
Supply Layout (dpi)
203
1536
1440
1344
1248
1152
1056
960
864
768
672
576
480
384
288
192
96
0.0
1624
1523
1421
1320
1218
1117
1015
914
812
711
609
508
406
305
203
102
0.0
FEED
192 0.0 96 192 288 384 480 576 672 768 806
203 0.0 102 203 305 406 508 609 711 812 853


203
Supply Layout (dpi)
300
1624
1523
1421
1320
1218
1117
1015
914
812
711
609
508
406
305
203
102
0.0
2400
2250
2100
1950
1800
1650
1500
1350
1200
1050
900
750
600
450
300
150
0.0
FEED
203 0.0 102 203 305 406 508 609 711 812 853
300 0.0 150 300 450 600 750 900 1050 1200 1275

VERIFIER FIELDS

V1 HEADER	V2 Verifier Field #
V	
V	
V	
V	

FORMAT HEADER

F1 HEADER	F2 FORMAT #	F3 ACTION	F4 DEVICE	F5 MEASURE	F6 LENGTH	F7 WIDTH	R8 NAME ("IN QUOTES")
F			R				

TEXT FIELDS

| T1 HEADER | T2 FIELD # | T3 # OF CHAR. | T4 FIX/VAR | T5 ROW | T6 COLUMN | T7 GAP | T8 FONT | T9 HGT. MAG. | T10 WID. MAG. | T11 COLOR | T12 ALIGNMENT | T13 CHAR. ROT. | T14 FIELD ROT. | T15 SYM. SET | OPTION #1 Fixed Characters: R1 HEADER | R2 CODE # | R3 FIXED CHAR. ("IN QUOTES") | OPTION #2 Data Type Restrictions: R1 HEADER | R2 CODE # | R3 CHAR CODE | OPTION #3 Data Entry Templates: R1 HEADER | R2 CODE # | R3 CODE | R4 "CHARACTER" ("IN QUOTES") | OPTION #4 Copy Data from Previous Field: R1 HEADER | R2 CODE # | R3 SRC FIELD | R4 SRC START | R5 # TO COPY | R6 DEST. START | R7 COPY CODE | OPTION #5 Data Entry Source: R1 HEADER | R2 CODE # | R3 CODE | OPTION #6 Upload Field Data: R1 HEADER | R2 CODE # | R3 DEVICE | OPTION #20 Data Entry Prompts: R1 HEADER | R2 CODE # | R3 PROMPT ("IN QUOTES") | OPTION #21 Define Extended Field Names: R1 HEADER | R2 CODE # | R3 "FIELD NAME" | OPTION #30 Pad Data: R1 HEADER | R2 CODE # | R3 L / R | R4 "CHARACTER" | OPTION #42 Price Field: R1 HEADER | R2 CODE # | R3 APP CODE | OPTION #61 Reimage Field: R1 HEADER | R2 CODE #
|---|---|---|---|---|---|---|---

VERIFIER FIELDS

	V1 HEADER	V2 Verifier Field #
V		3
V		
V		
V		

FORMAT HEADER

	F1 HEADER	F2 FORMAT #	F3 ACTION	F4 DEVICE	F5 MEASURE	F6 LENGTH	F7 WIDTH	R8 NAME ("IN QUOTES")
F		1	A	R	E	300	400	"TEXTILES"

TEXT FIELDS

| | T1 HEADER | T2 FIELD # | T3 # OF CHAR. | T4 FIX/VAR | T5 ROW | T6 COLUMN | T7 GAP | T8 FONT | T9 HGT. MAG. | T10 WID. MAG. | T11 COLOR | T12 ALIGNMENT | T13 CHAR. ROT. | T14 FIELD ROT. | T15 SYM. SET | OPTION #1 Fixed Characters: R1 HEADER | R2 CODE # | R3 FIXED CHAR. ("IN QUOTES") | OPTION #2 Data Type Restrictions: R1 HEADER | R2 CODE # | R3 CHAR CODE | OPTION #3 Data Entry Templates: R1 HEADER | R2 CODE # | R3 CODE | R4 "CHARACTER" ("IN QUOTES") | OPTION #4 Copy Data from Previous Field: R1 HEADER | R2 CODE # | R3 SRC FIELD | R4 SRC START | R5 # TO COPY | R6 DEST. START | R7 COPY CODE | OPTION #5 Data Entry Source: R1 HEADER | R2 CODE # | R3 CODE | OPTION #6 Upload Field Data: R1 HEADER | R2 CODE # | R3 DEVICE | OPTION #20 Data Entry Prompts: R1 HEADER | R2 CODE # | R3 PROMPT ("IN QUOTES") | OPTION #21 Define Extended Field Names: R1 HEADER | R2 CODE # | R3 "FIELD NAME" | OPTION #30 Pad Data: R1 HEADER | R2 CODE # | R3 L / R | R4 "CHARACTER" | OPTION #42 Price Field: R1 HEADER | R2 CODE # | R3 APP CODE | OPTION #61 Reimage Field: R1 HEADER | R2 CODE #
|---|---|---|---|---|---|---|---|---

PRINTER DIFFERENCES

E

Here are the major features and differences between each printer. Earlier printer versions may not support all features.

Printer Comparison

Feature	9825 Printer	9855/9860 Printer
Printhead Density DPI (dots per inch)	203 DPI	203 DPI 300 DPI (optional)
Print speed IPS (inches per second)	2.5, 4.0, or 6.0 IPS	2.5, 4.0, 6.0, 8.0, 10.0, or 12.0 IPS (optional) 9860 max. is 8.0 IPS
Maximum print area	4.0" x 16.0"	4.0" x 16.0" 4.0" x 13.0" (w/300 dpi)
Non-Print Zone	Recommended: all supplies - .05" on either edge and .02" at the end Butt cut supplies - .15" at the beginning	Recommended: all supplies - .05" on either edge and .02" at the end Butt cut supplies - .15" at the beginning
Location of Print Area	Center	Center
Supply Width	.75" x 4.25"	.75" x 4.25"
Supply Length	.50" x 17.5"	.32" x 17.5"
Power Up Mode	Online	Online/Offline
Feed Mode	On demand/Continuous/ Peel Mode (optional)	On demand/Continuous/ Peel Mode (optional) 9860 does not support peel mode
Supplies	Labels or Perforated Tags	Labels or Tags
Supply Type	Edge Aperture/Black mark/ Die cut/ Continuous	Aperture/Black mark/Die cut/ Continuous 9860 does not support continuous supply
Keypad	Feed/Cut Enter/Pause Escape/Clear buttons	Feed/Cut Enter/Pause Escape/Clear buttons 9860 printer comes with an external keyboard
Display	2-line 16 characters per line	2-line 16 characters per line
Serial Port Speed	1200/2400/4800/9600/ 19200/38400 Baud	1200/2400/4800/9600/ 19200/38400/57600/ 115200 Baud

Feature	9825 Printer	9855/9860 Printer
Field Number Range	0-999	0-999
Batch Separator	Yes	Yes
High Energy Ribbon	No	Yes
Standard Fonts	Standard/Reduced/Bold OCRA/CG Triumvirate Typeface Bold 9 pt/CG Triumvirate Typeface 6, 7, 9, 11, or 15 pt	Standard/Reduced/Bold OCRA/CG Triumvirate Typeface Bold 9 pt/CG Triumvirate Typeface 6, 7, 9, 11, or 15 pt
Scalable Font Standard	Yes (EFF Swiss Bold)	Yes (EFF Swiss Bold)
Downloadable Fonts	Yes	Yes
Memory Allocation	Yes	Yes
RAM	4 Meg 2 Meg (Flash)	16 Meg 4 Meg (Flash)
Storage on Power-down	512K (Flash)	In Flash
Extended Memory	No	Yes
2D bar codes	MaxiCode/PDF417 POSTNET/Data Matrix/Quick Response	MaxiCode/PDF417 POSTNET/Data Matrix/Quick Response
Parallel Port	IEEE-1284 or Centronics Mode	IEEE-1284 or Centronics Mode
94x5 Emulation	No	Yes
Backfeed	Yes	Yes
Offline Batch Entry	No	Yes, with keyboard
Status Polling	Yes	Yes
Immediate Commands	Yes	Yes
Test Label	Two labels for user and printer configuration	Two labels for user and printer configuration
Ethernet Print Server	Yes- supports IPX (NetWare), TCP/IP, LAT, AppleTalk, and NetBios/NetBEUI.	Yes- supports IPX (NetWare), TCP/IP, LAT, AppleTalk, and NetBios/NetBEUI.
RF Print Server	Yes	Yes
External Knife	No	Optional on 9855 Standard on 9860
Stacker	No	Yes
Verifier	No	Yes
External Rewind	Yes	Yes
Tear Bar	Yes (optional)	Optional on 9855 NA on 9860
12 IPS	No	Optional on 9855 NA on 9860
300 DPI	No	Yes (optional)
RFID support	No	Yes for 9855; No for 9860

Post-Print Options

The following post-print options are available:

Printer	926 Knife	928 Stacker	932 Stacker	935 Rewind	938 Verifier	939 Keyboard	945 Unwinder	Tear Bar	Peel Mode
9855	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
9860 (includes knife)	No	No	Yes	No	Yes	Included with printer	Yes	No	No

It may be desirable to install the printer, knife, and stacker on sound-absorbing material in office, commercial, or industrial environments.

The verifier cannot be used with the 926 Knife and/or 928 Stacker combination.

The 9855 “knife ready” printer does not support on-demand/peel mode or the optional tear bar.

The 926 knife must be installed before you can use the 928 stacker.

To use the 938 verifier, the printer must be ordered “verifier ready” to receive the correct cut-out cover, which allows room for the verifier’s beam and for tearing supplies.

GLOSSARY

Batch Data
2,"Monarch"¦
Defines the actual information (as fields within **{ }**) printed on the label.

Batch Control
E,0,1,4,2¦
Defines the print job (as a field).

Batch Header
{B,1,N,1}
First line of a batch, immediately following (**{**). Identifies the format and batch quantity.

Batch Packet
{B,1,N,1¦
2,"Monarch"¦}
Contains a batch header and the batch data. Enclosed within { }.

Bitmapped Fonts
Reside in the printer's memory. If you change the point size, you have changed the font. Magnifying these fonts causes some jaggedness to occur.

Buffer
Storage area in the printer's memory that holds specific data (images, formats, etc).

Field
Can be text, bar codes, lines, boxes, constant, or non-printable text. It is the result of a field definition.

Field Definition
Any string of parameters that pertain to one field. A field definition begins with a field identifier (such as T, B, D, C, etc.).

```
T,1,10,V,250,50,0,1,1,1,B,C,0¦
```

Field Parameters
Parameters that apply to a field and are separated by commas. (In the above example, **B** is a field element for black print on a white background.)

Flash Memory
Contains information that is SAVED when the printer is turned off. Flash memory needs to be formatted before it can be used.

Format
Layout or design for your printed label.

Format Header — First line of a format, immediately following the start of packet (**{**). A format header must begin with **F**, followed by various header elements.

```
{F,1,A,R,E,600,400,"Fmt-1" ¦
```

Monospaced Fonts — All characters have the same width and are easy to center justify. (Standard, bold, and reduced are monospaced.)

Non-volatile RAM — Contains information that is SAVED when the printer is turned off.

Option
R,4,6,1,3,1 ¦ — Any line within a format that applies special formatting to a field. This line always begins with **R** and must immediately follow the field it applies to.

Packet
{B,1,N,1 ¦
2,"Monarch" ¦ } — Any string of characters within (**{ }**).

Pre-image — A way to optimize the printer, because it images the fields while data is collected. After the last field is imaged, the label prints almost immediately.

Proportionally Spaced Fonts — All characters have different widths and are difficult to center justify (CG Triumvirate™ Typefaces).

Scalable Fonts — All characters are scalable and smooth at any point size. There are no jagged edges at any point size because the font is created from an equation every time it is used.

Soft (Downloaded) Fonts — Reside in the printer's RAM. They can be erased or overwritten.

TrueType Fonts — All characters follow the TrueType outline font standard. All characters are scalable and smooth at any point size.

Volatile RAM — Contains information that is LOST when the printer is turned off.

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